Oracle Data Integrator 11g

Hands-on Workshop

Student's Lab Book

Authors

Jignesh Mehta
Shirley Lum

Main Contributors

Naresh Nemani
Leon Liem
Jignesh Mehta
Gabriel Nistor
Farzin Barazandeh
Andrei Deneasa
Aniket Raut

Reviewers

Denis Gray
Alex Kotopoulis
Julien Testut
Danilo Camacho
Karthic Balasubramani
Richard Jacobs
Henry Xue

Workshop Image

Jignesh Mehta

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
USA

Worldwide inquiries:
Phone: +1 650 506 7000
Fax: +1 650 506 7200

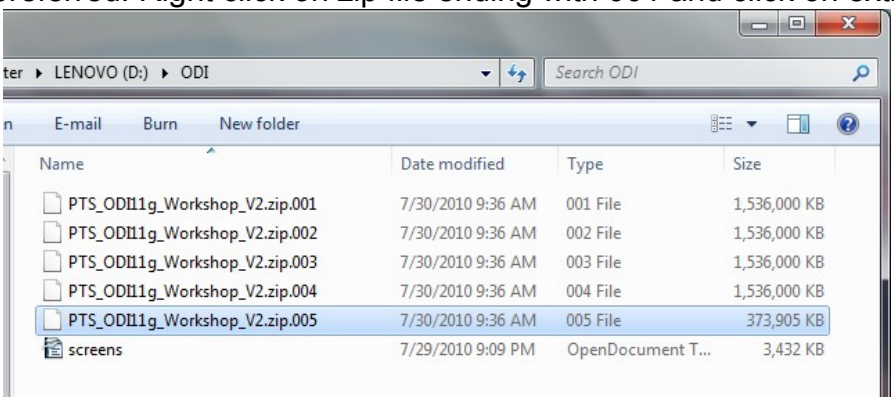
www.oracle.com

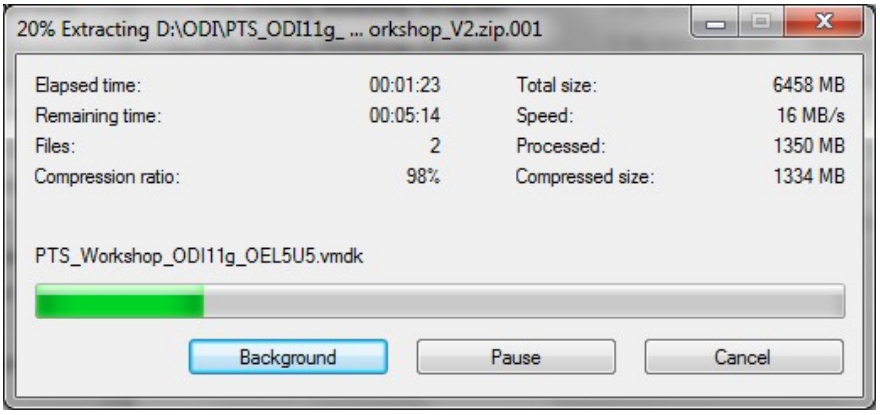
Oracle is the information company

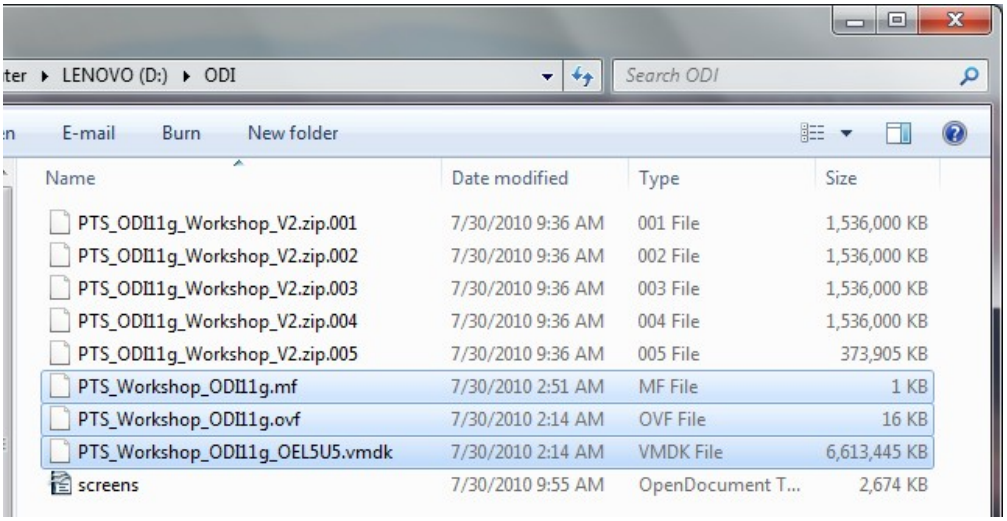
Table of Contents

Lab 1: PTS ODI 11g Workshop Image Setup

1. Download five zip files and **unzip the first zip file only** which will create all required VM files and folder containing documents. Use of 7Zip utility is preferred. Right click on zip file ending with 001 and click on extract all.

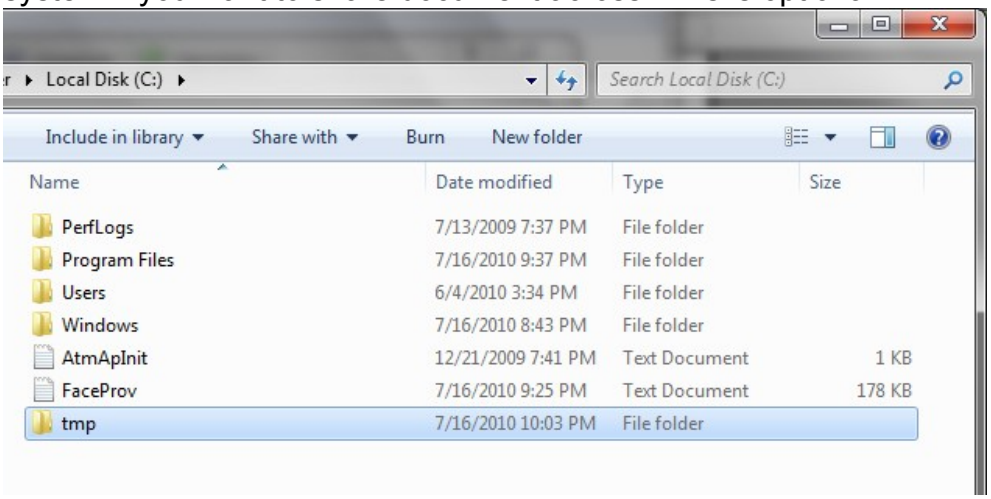




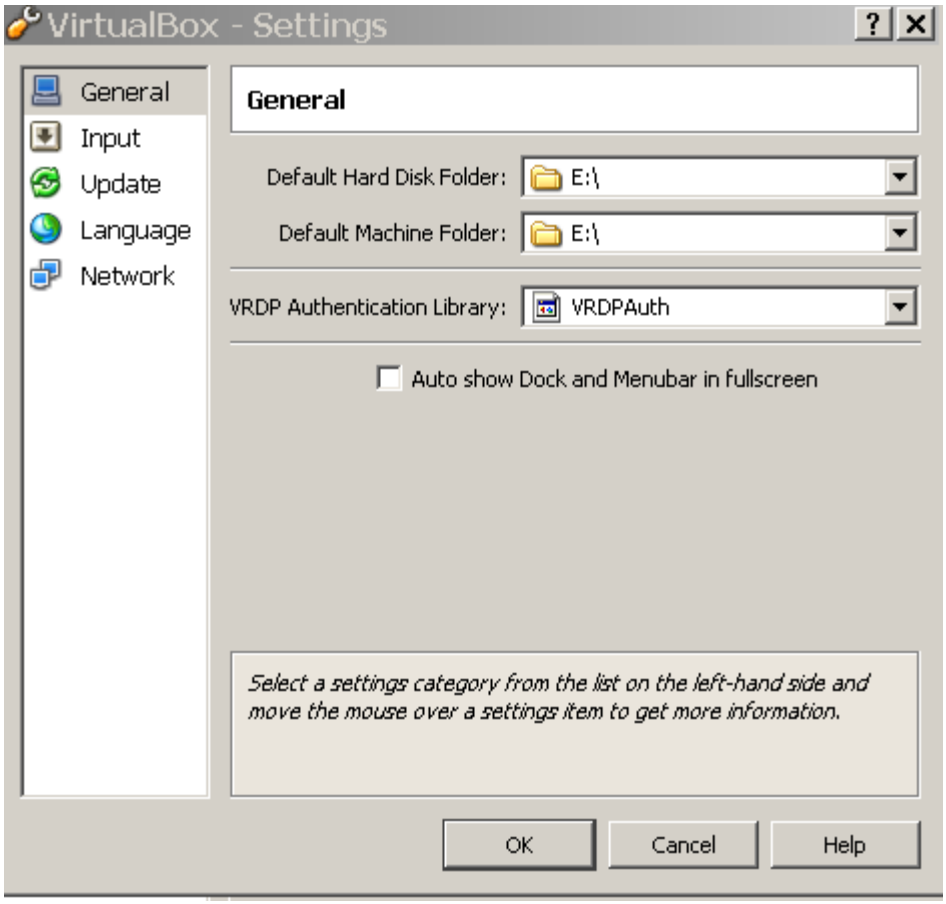


2. Download and install, if not already, Oracle VirtualBox for Windows hosts (3.2.8 latest version): http://www.virtualbox.org/wiki/Downloads

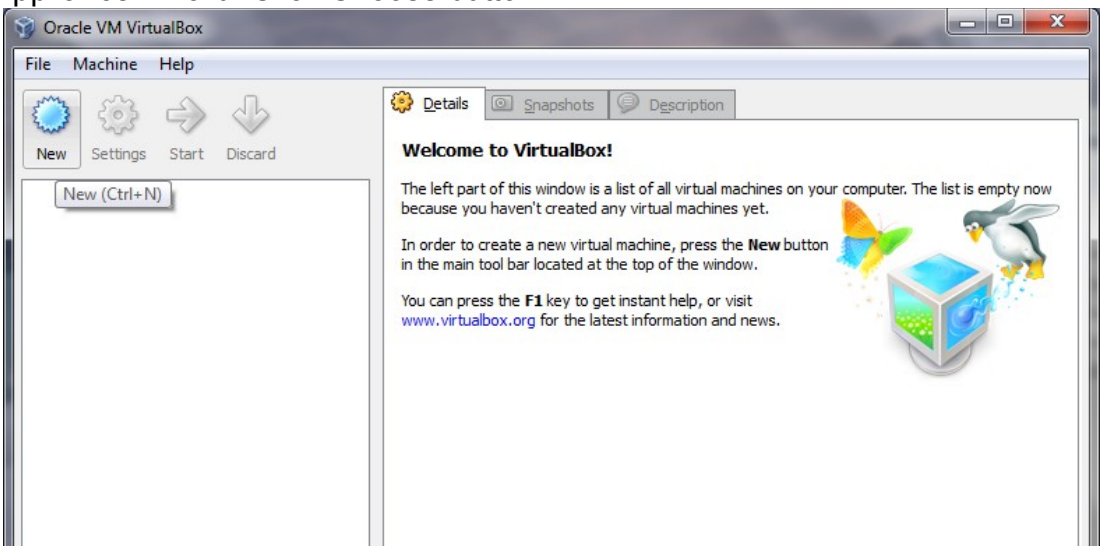
3. Make sure you have C:\tmp dir which is shared dir with Linux guest system if you want to share document across. This is optional.

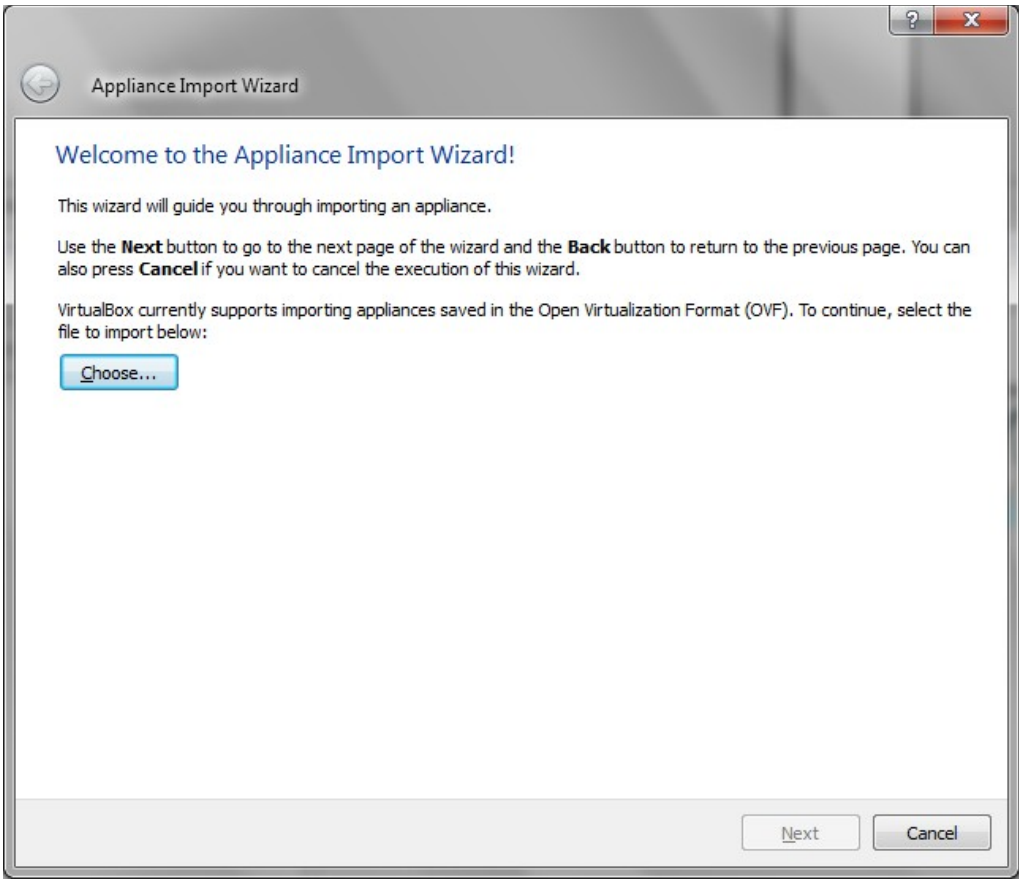


4. Open VirtualBox from Program Files. OPTIONAL: If you want to change the default properties for your virtual machine, click on Preferences from File menu and set the desired default folder locations.

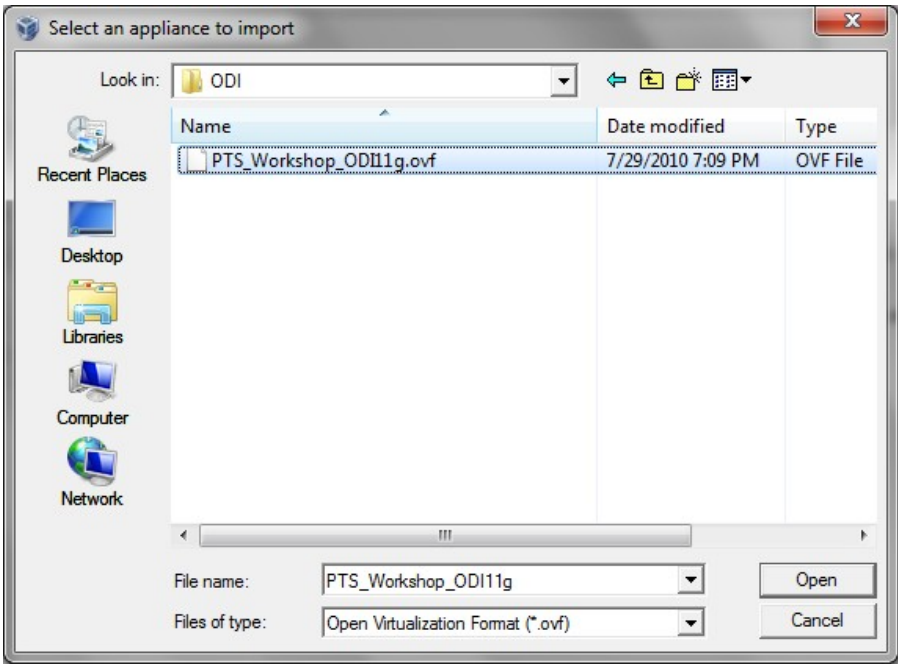


5. Click on Import Appliance Menu from File menu list which will bring Import Appliance wizard: Click Choose button

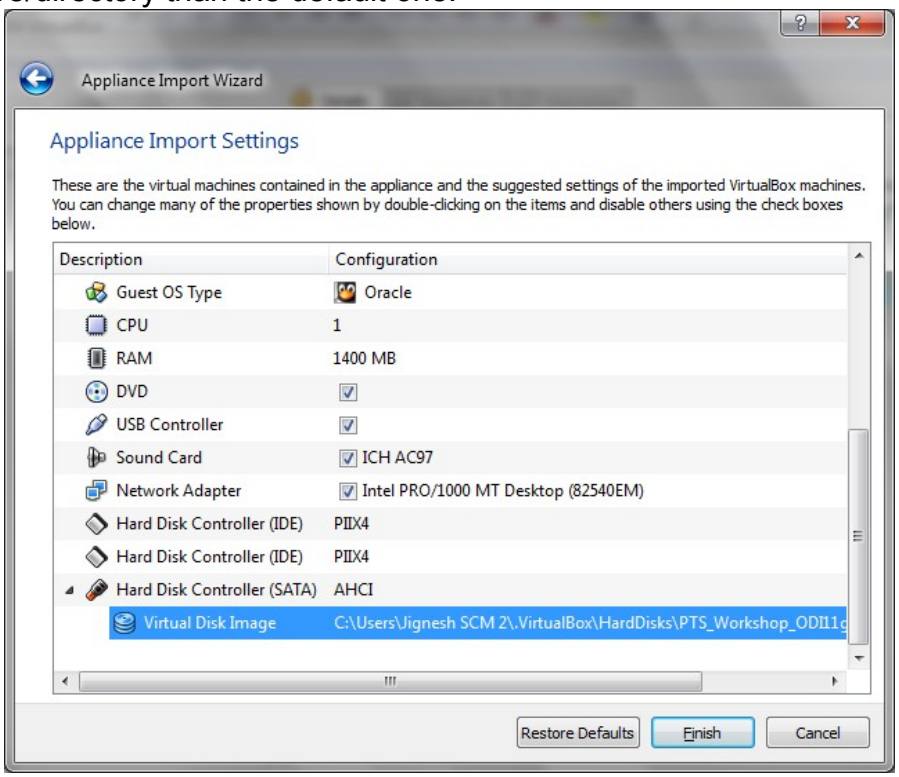




6. Select PTS_Workshop_ODI11g.ovf file from unzipped folder:



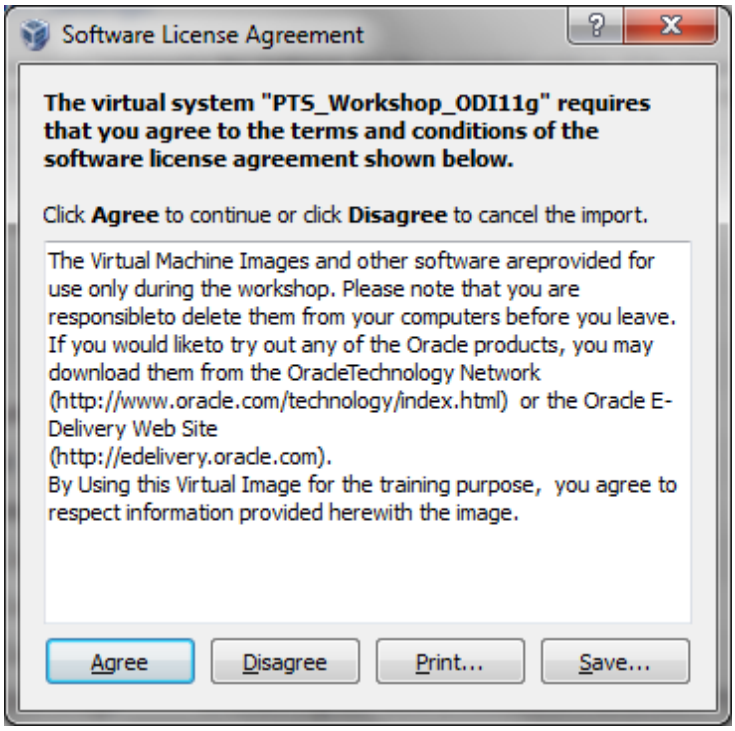
7. Import will display Image parameters, scroll down and select different directory for Image file that will be created, if you want to store it on different drive/directory than the default one:

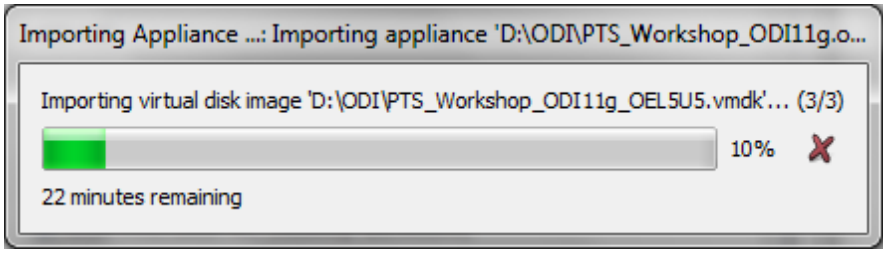


Note: Selecting a different directory for Image file from the Appliance Import Settings screen may not take effect. Alternatively, you can change the directory from File > Preferences as described in step 4 above.

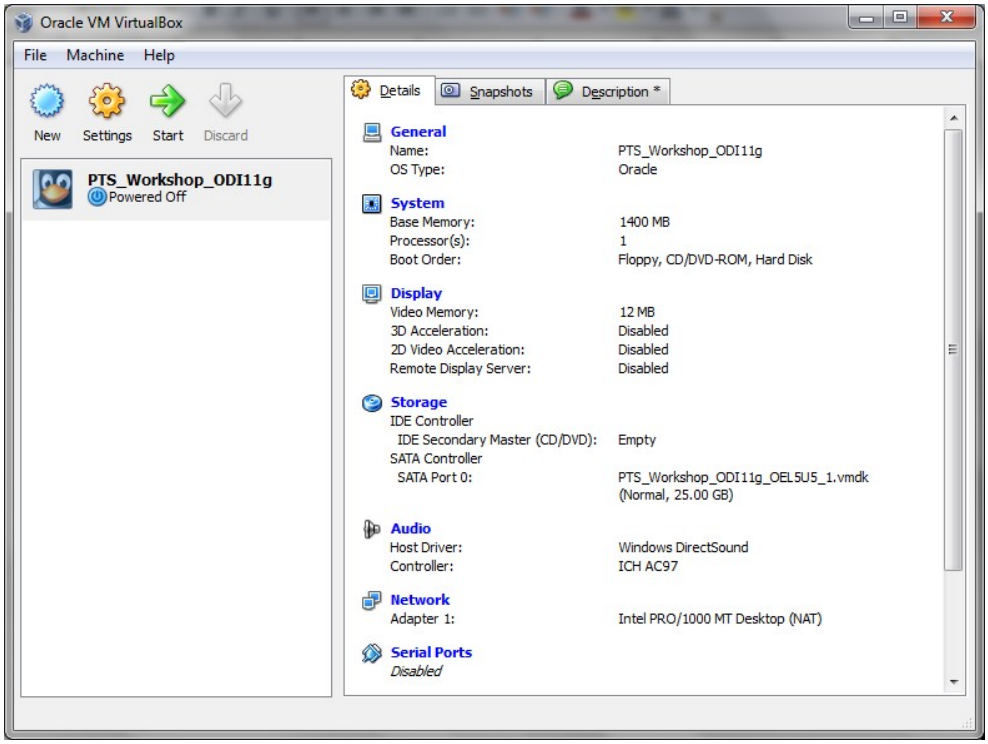
Click Finish.

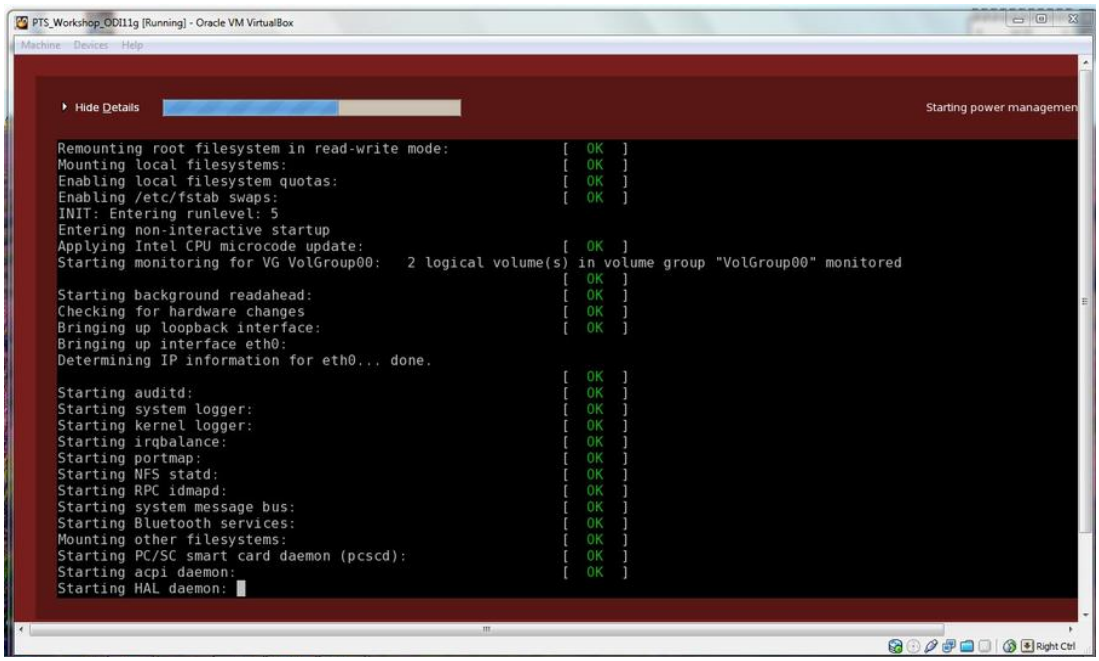
An agreement window will pop up to explain the purpose of VM image. Please click on Agree button to continue, which will create VM image disk on directory you specified on parameter page.



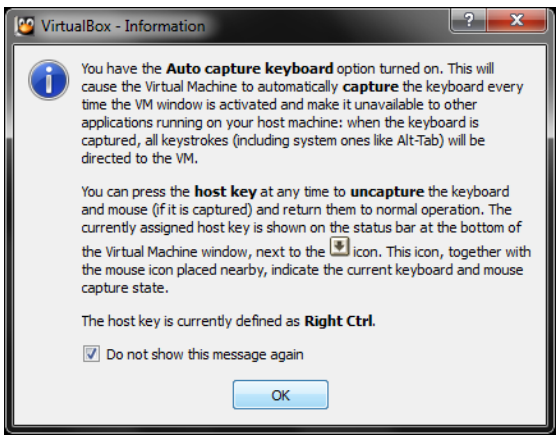


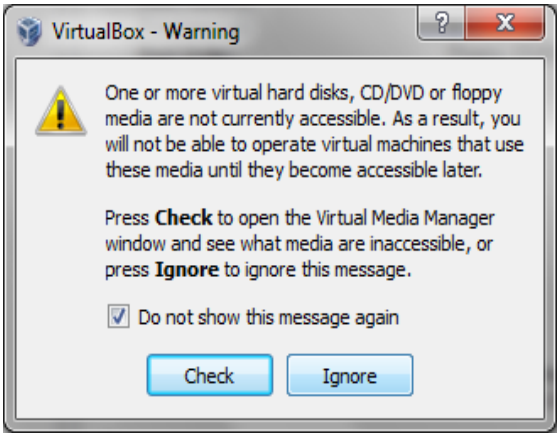
8. Once disk is created, you will be presented with configured VM image within VirtualBox window. Click on Green Start arrow to launch the image and to work within Linux guest operating environment.



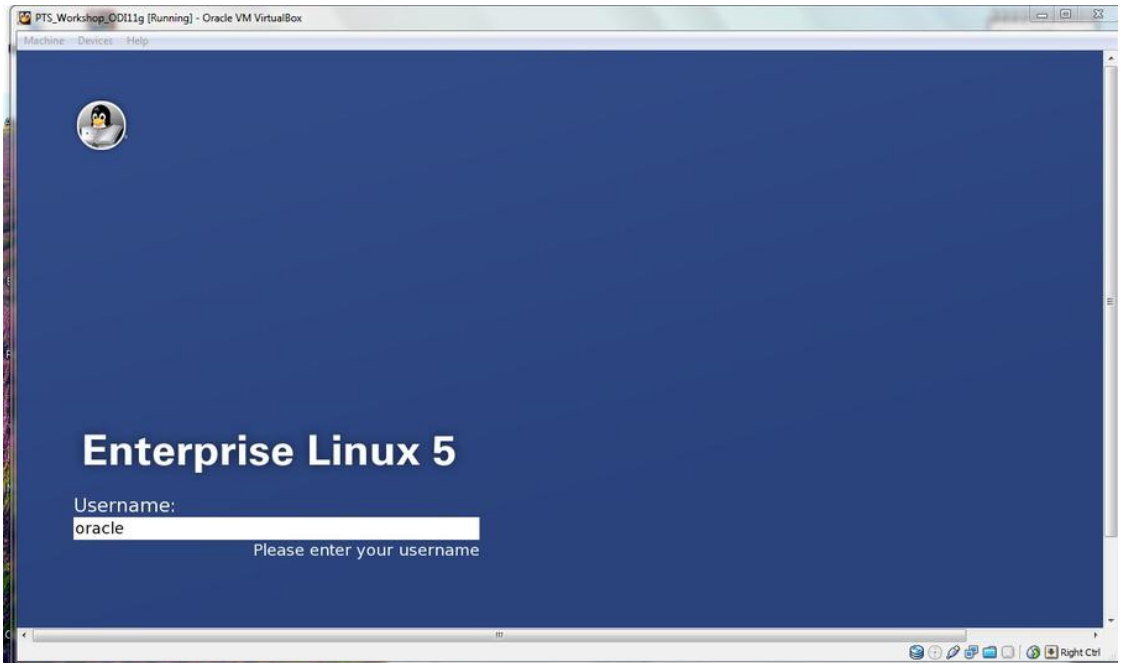


9. If popup come asking confirmation on Keyboard/Mouse capture, Click on check box and OK as image starts.

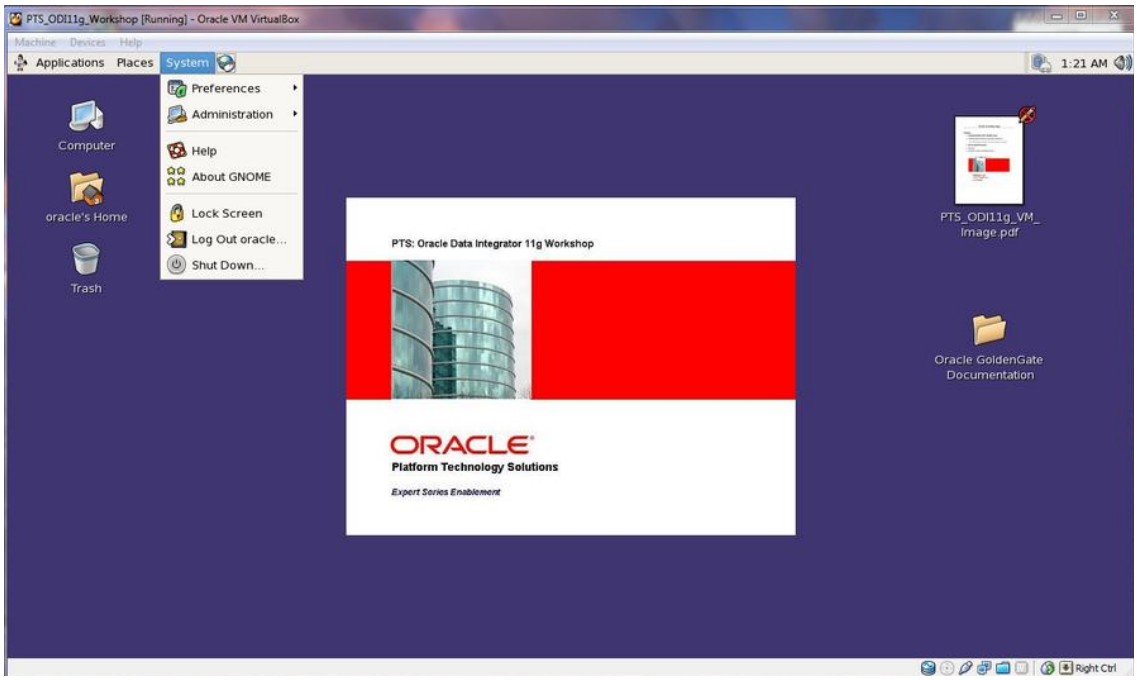




10. Once image starts, enter ‘oracle’ as user name and password



11. To open terminal window, just right click anywhere on the desktop and select Open Terminal menu. When you wish to shutdown VM image, remember to shutdown the image by going through system menu and selecting shutdown.


PTS_ODI11g_Workshop [Running] - Oracle VM VirtualBox
Machine Devices Help
Applications Places System
1:21 AM
Preferences
Administration
Help
About GNOME
Lock Screen
Log Out oracle...
Shut Down...
Computer
oracle's Home
Trash
PTS_ODI11g_VM_Image.pdf
Oracle GoldenGate Documentation
PTS: Oracle Data Integrator 11g Workshop
ORACLE
Platform Technology Solutions
Expert Series Enablement
Right Ctrl

Lab 2: Workshop Image Overview

2.1 Lab Introduction

Lab Introduction: Workshop labs will help Data Integration Developers, Warehouse Developer, DBAs and Architects gain hands on experience with some of the best practices for implementing E-LT techniques to improve performance and reduce data integration costs using Oracle Data Integrator Enterprise Edition (ODI-EE). Labs are designed to help gain understanding of ODI features and techniques by allowing participants to walk through the steps that are needed to load and transform various sources into a relational table target. This will also include how to deploy and manage interfaces using ODI-EE and ODI environment.

Scenario: Our Company is in the process of building a Sales Data Warehouse to support BI system for reporting on our customer and sales data. The physical schema for our target star schema has been finalized and we have been assigned to build the interfaces and packages in ODI to load this star schema.

Our supporting data is in various heterogeneous systems, located across the enterprise. Sales, customer and country data will be imported from our Sales system located on MySQL Database Server. Our product management system contains our product and costing data and this information can be provided as comma delimited extracts. Our sales and marketing system is an internet based system; we will be provided an XML extract of our promotional data and sales org data from this system. The following lessons will walk us through various steps that are needed to create the interfaces and packages need to load the reporting star schema. With help of different labs, we will examine various aspects of interface design, deployment, execution and monitoring ODI projects. Each lab may provide more contexts to the scenario with respect to specific lab activities.

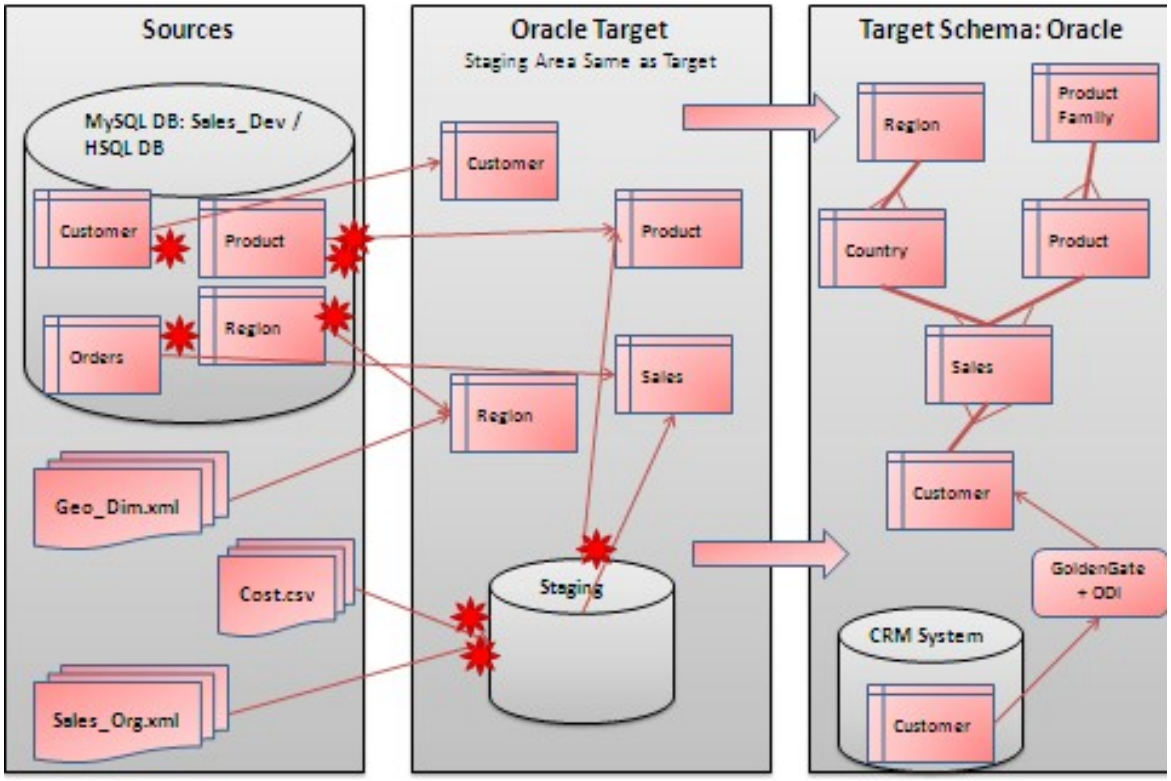
Prerequisites

Before you begin this workshop, you should

· Have a general understanding of RDBMS concepts.

· Have a general understanding of ETL concepts.

2.2 Architecture Overview



Sources:

Data Sources	Type
Customer	MySQL DB - Sales Dev / HSQL DB
Orders	MySQL DB - Sales Dev /HSQL DB
Product	MySQL DB - Sales Dev / HSQL DB
Region	MySQL DB - Sales Dev / HSQL DB
Sales Org	XML File
Cost	CSV File
Geo DIM	XML File

Targets:

Target DB	Type
Customer	Oracle DB
Product	Oracle DB
Sales	Oracle DB
Region	Oracle DB
CRM Customer Source/Target	Oracle DB

2.3 Workshop Image Overview

Once you start PTS ODI Workshop VirtualBox image, log into Enterprise Linux with username / password as **oracle / oracle**.

2.3.1 Software Components and Access Information

MySQL: Database: sales_dev - Source Schema. Username /pwd: pts / oracle

HSQL DB: username/pwd: sa / blank
To start HSQL, on terminal window, type > **startHSQL**

Oracle DB: Database: XE login info

Sales Data Warehouse: cust_dw_dev / cust_dw_dev - Target (TRG_*)
cust_dw_prod / cust_dw_prod - Target Schema
cust_dw_dev / cust_dw_dev - Dup Source (SRC_*)
rep_trainingm / rep_trainingm - ODI Master Rep
rep_trainingw / rep_trainingw - ODI Work Rep

ODI Repository username/password: SUPERVISOR / SUPERVISOR

Weblogic: login: weblogic / oracle123

Agent: J2EE Agent (OracleDIAgent) and Standalone Agent (localagent)

GoldenGate username / pwd: system / oracle

2.3.2 Components Access

MySQL and Oracle Database starts as a service when Image starts.

A. Oracle Database Console: Oracle DB on VM Bookmark on Browser

B. ODI Studio

a. Open Terminal

b. > **odistudio** *# to launch ODI Studio*

c. Login to PTS ODI11g Master or Work Rep

login: SUPERVISOR / SUPERVISOR

d. # open new terminal to start stand alone agent

e. > **startLocalAgent** # to start local agent deployed as stand alone agent

C. SQL Developer

a. Open Terminal

b. > **sqldev** *# to launch SQL Developer Tool*

c. There are preconfigured connection to Oracle DB and MySQL DB to browse the tables and data and/or to clean up data for lab.

D. **Goldengate** user / pwd: ggs_owner / ggs_owner

a. **ggsci** *# loginto Goldengate to test connection*

b. ggsci> **DBLOGIN USERID system, PASSWORD oracle**

c. ggsci> **exit;** *# exit form Goldengate connection to database*

E. Weblogic Server

A. Start Node Manager

a. Open Terminal # Do not close this winodw, minimize it

b. > **startNodeManager** *# to start node manager for weblogic*

B. Start Weblogic Server – admin domain

a. Open Terminal

b. > **startWLS** *# to start weblogic*

C. Start ODI Domain – ptsodi_domain

a. Open Terminal

b. > **startODIServer** *# to start odi doamin.* When asked, please enter username / pwd: weblogic / oracle 123

D. Middleware EM, WLS and ODI Console

a. http://pts.us.oracle.com:7001/em
Login: weblogic / oracle123

b. http://pts.us.oracle.com:7001/console
Login: weblogic / oracle123

c. http://pts.us.oracle.com:8001/odiconsole
Login: SUPERVISOR / SUPERVISOR

E. Stop Weblogic Services

a. Open Terminal

b. > **stopODIServer** *# to stop odi doamin, enter user/pwd*

c. > **stopWLS** *# to stop admin doamin*

d. Close terminal window running node manager

2.3.3 Directory Path and Shortcuts

1. > oraclehome *# dir to oracle home where database is installed*
2. > odihome *# dir to dir where ODI Deveoloper is installed*
3. > wlshome *# dir where weblogic is installed*
4. > odidomain *# dir to weblogic domain for odi*
5. > hostshare *# dir to shared files/folder with host OS*

Note: On Windows host make sure you have C:**tmp** dir, which is default shared directory with linux enviroment for our image

2.3.4 Other Resources

1. ODI Documentation:
   http://www.oracle.com/technetwork/middleware/data-integrator/overview/index.html

   http://www.oracle.com/technetwork/middleware/data-integrator/documentation/index.html

   http://www.oracle.com/technetwork/middleware/data-integrator/community/index.html

2. Database Documentation:
   http://www.oracle.com/pls/db112/homepage

3. Weblogic Documentaiton:
   http://download.oracle.com/docs/cd/E14571_01/index.htm

Lab 3: Building First Interface – Simple Transformation

Introduction

An integration interface consists of a set of rules that define the loading of a datastore or a temporary target structure from one or more source datastores.

An integration interface is made up of and defined by the following components:

- **Target Datastore** - The target datastore is the element that will be loaded by the interface.
- **Datasets** - One target is loaded with data coming from several datasets. Set-based operators (Union, Intersect, etc.) are used to merge the different datasets into the target datastore.
- **Diagram of Source Datastores** - A diagram of sources is made of source datastores – possibly filtered – related using joins. The source diagram also includes lookups to fetch additional information for loading the target.
- **Mapping** - A mapping defines the transformations performed on one or several source columns to load one target column. These transformations are implemented in the form of SQL expressions.
- **Staging Area** - The staging area is a logical schema into which some of the transformations (joins, filters and mappings) take place. It is by default the same schema as the target's logical schema. It is possible to locate the staging area on a different location (including one of the sources).
- **Flow** - The flow describes how the data flows between the sources, the staging area if it is different from the target, and the target as well as where joins and filters take place. The flow also includes the loading and integration methods (Loading and Integration Knowledge Modules - LKM, IKM).
- **Control** - An interface implements two points of control. Flow control checks the flow of data before it is integrated into the target. Post-Integration control performs a static check on the target table at the end of the interface (Check Knowledge Module - CKM).

The Interface Editor provides a single environment for designing integration interfaces. The Interface Editor enables you to create and edit integration interfaces.

Prerequisites

Login to ODI Studio by following instructions provided in Lab 2.3.2 Components Access. Connect to Work Repository **PTS Training Work Repository** from ODI Studio with user **SUPERVISOR** and password **SUPERVISOR**.

Process Overview

The following step sequence is usually performed when creating an interface, and can be used as a guideline to design your first interfaces:

1. Create a New Interface
2. Define the Target Datastore
3. Define the Datasets
4. Define the Source Datastores and Lookups
5. Define the Mappings
6. Define the Interface Flow
7. Set up Flow Control and Post-Integration Control
8. Execute the Integration Interface

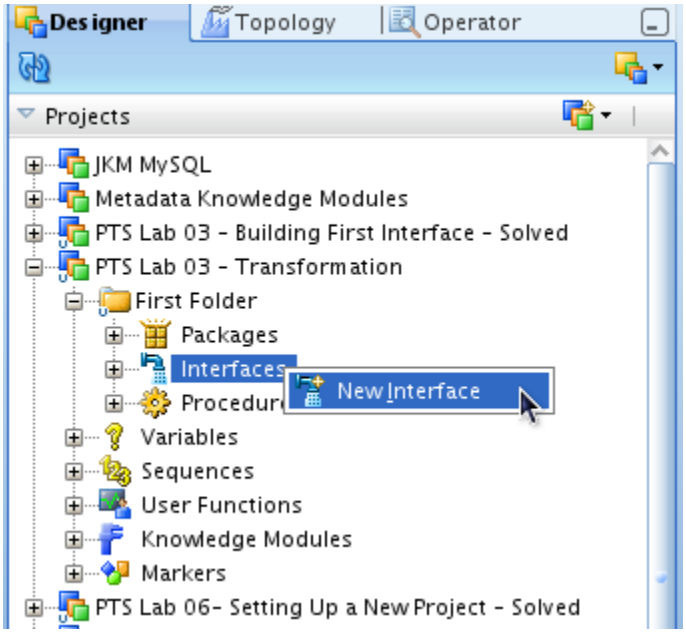
Scenario

We will first start with what ODI developers do most: design data transformations and data flows. In our first set of exercises, we will use an environment where all administration tasks have been done for us: connectivity to the databases, import of the metadata, so that we can focus immediately on what makes “a day in the life of an ODI developer.” Later in this training, we will get back to the definition of the connectivity and the import of the metadata.

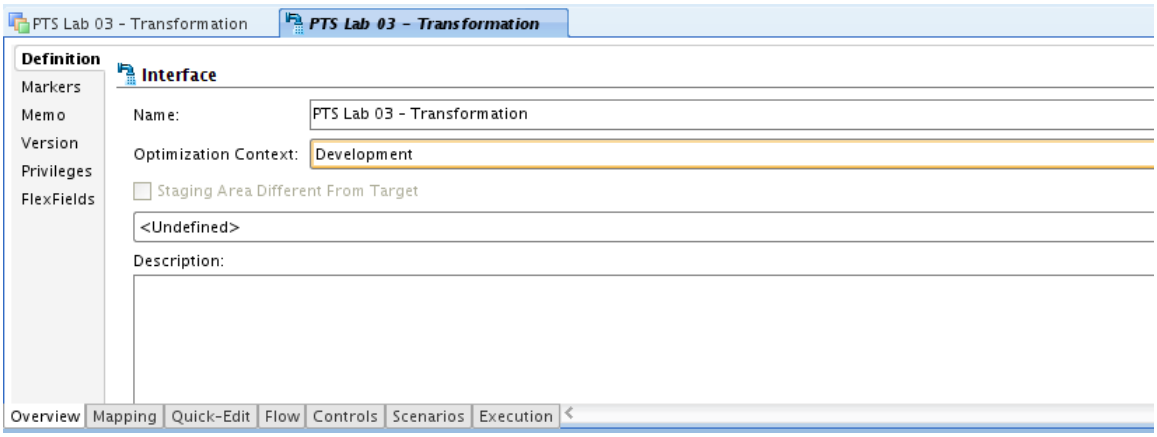
Instructions

1) In the project ***PTS Lab 03 – Building First Interface***, expand First Folder, right-click on Interfaces, and create a new interface called “PTS Lab 03 – Transformation” loading the TRG_CUSTOMER datastore in the Oracle Sales Warehouse model with the content of the src_customer table from the MySQL Sales Data Source model. You must map the columns of the same name without any transformation. Ensure that you take only distinct records.

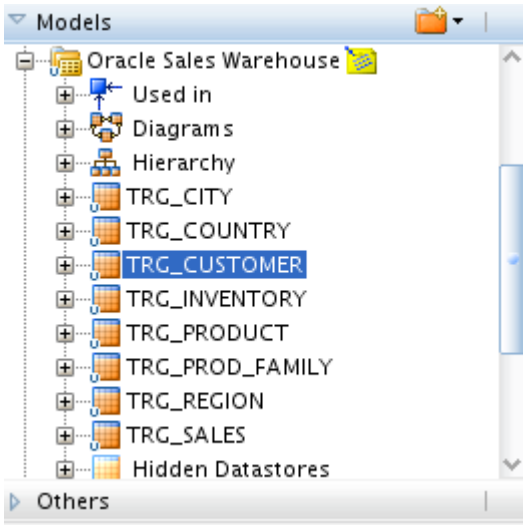
a) In Designer, click the Projects tab, and expand the “PTS Lab 03 – Building First Interface” project. Expand the First Folder. Select the Interfaces node, right-click and select the New Interface option.



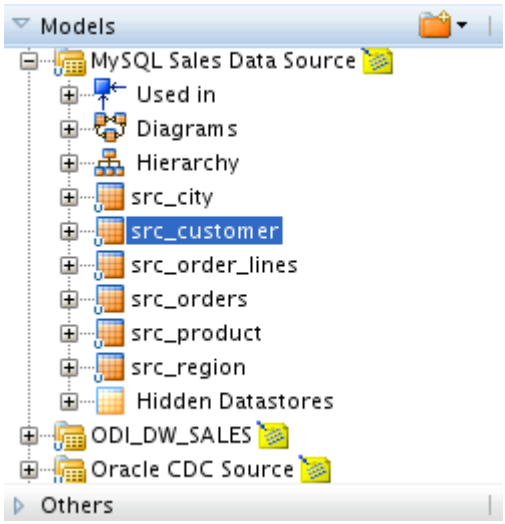
b) In the Interface window, enter PTS Lab 03 - Transformation as the name of the interface. Ensure that the Optimization Context is Development. Click the Mapping tab.

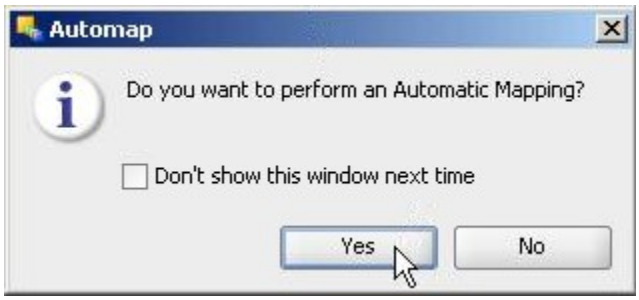


c) In the Designer Navigator to the left, click the Models tab. In the tree view, expand the Oracle Sales Warehouse model. Drag the TRG_CUSTOMER datastore from the tree view to the **Target Datastore** zone (see screenshot below: the panel to the ***right*** of the panel with text stating "Target Datastores…. as sources for this dataset"). The datastore appears in this zone.



d) Expand the MySQL Sales Data Source model and drag the src_customer datastore from the model tree to the ***Sources*** zone of your diagram (the panel to the ***left*** of the target panel). An Automap dialog box appears. Click Yes. Now the system automatically maps fields in the source and target datastores.





e) Use the following table to map and verify all columns mapping:

MySQL server column	Oracle Column	Transformation	SQL Syntax
Dear	Dear	Change 0 into Mr Change 1 into Mrs Change 2 into Ms	Case when <expression> then <value> when <expression> then <value> else <value> End
First_Name, Last_Name	CUST_NAME	Concatenate the first name and the last name. Capitalize the first letter for both. Put a space between first and last name	Use a + sign on SQL server, or a || on Oracle. Use InitCap on Oracle to initialize the first letter.
Address	Address	None	
Phone	Phone	None	
Age	Age	None	
	Age_Range	Not mapped	
	Sales_Pers	Not Mapped	
	Cre-Date	System date on the target machine. Do not modify this value if there is an update	Sysdate on Oracle
	Upd_Date	System date on the target machine	Sysdate on Oracle
Custid	Cust_id	None **(Beware: this field is not automatically mapped!)**	
City_id	City_id	None	

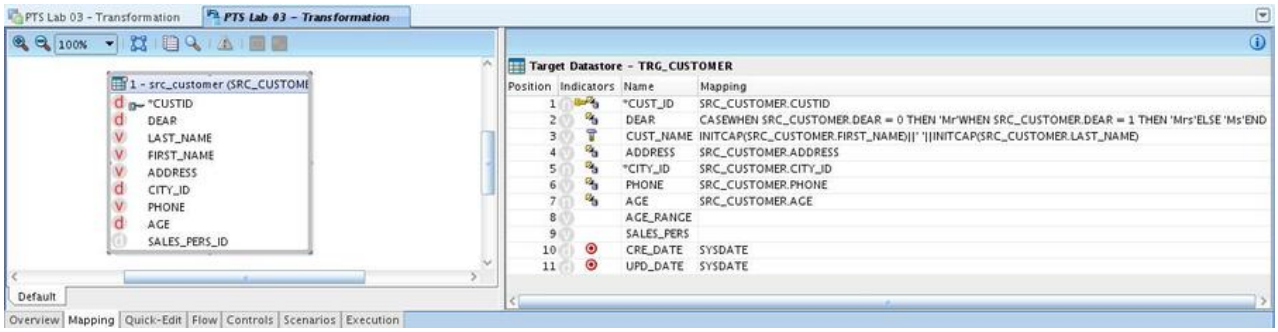
To perform a mapping:

- Clicking on the target column will open the mapping area at the bottom of your screen

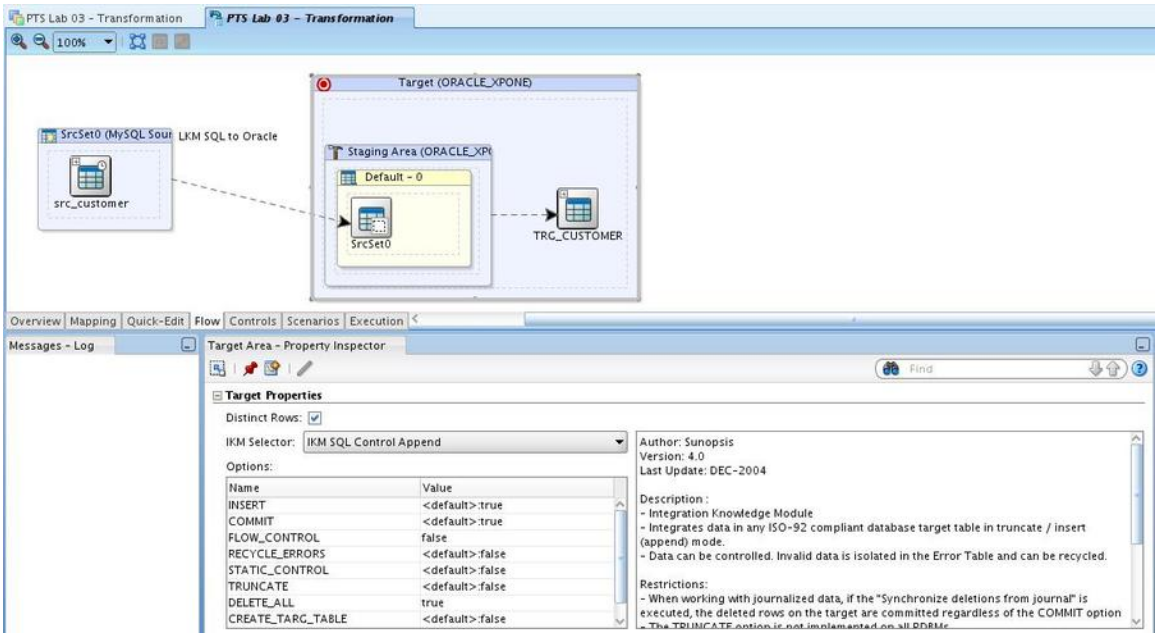
- Drag and drop the columns you need for your transformations in that mapping area (**not on the target column**, how tempting it may be). You can build your transformation logic in this field.

- If you scroll down a little bit in the mapping area, you can choose on which system the mapping will be executed (source, staging area, target). Except for literals, mappings are always on the source or the staging area. The staging area is on the target system by default.

- Write the mapping expression using the appropriate SQL for the database you have chosen. You can use the expression editor  to get some help with the appropriate syntax.



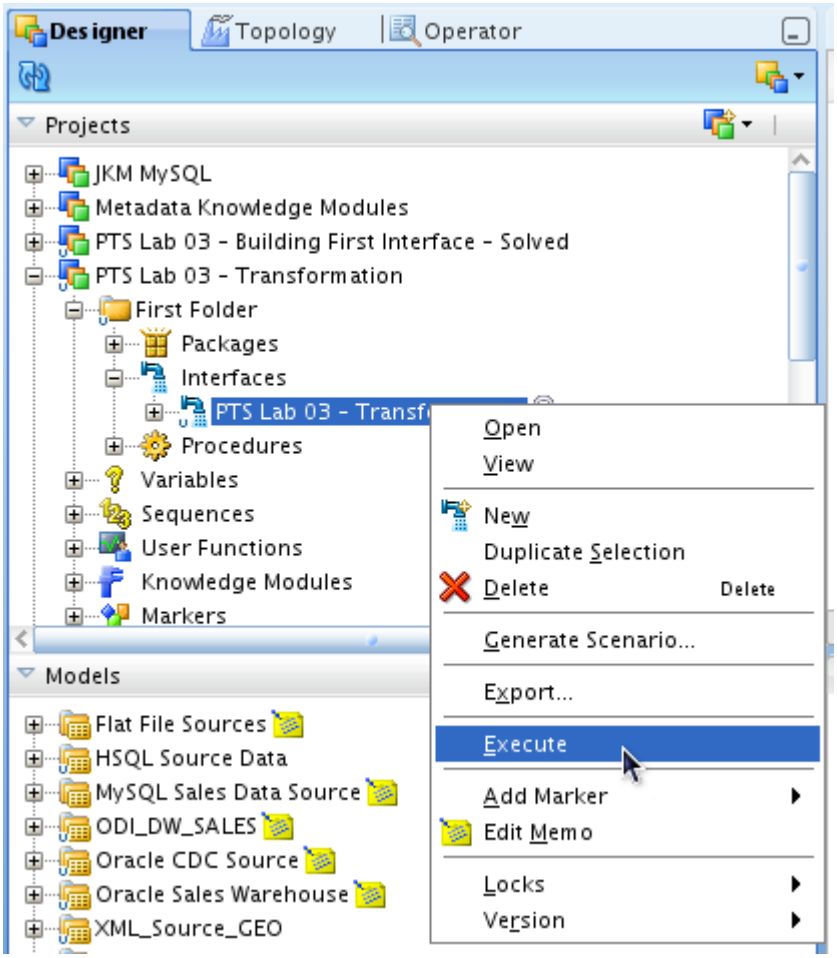
f) Click the Flow tab. After the flow diagram initializes, you may wish to use the zoom out button to see all objects in the diagram. Click the box for Target **+** Staging Area labeled Target (ORACLE_ORCL_LOCAL), and then in the Target Properties panel, select the Distinct Rows check box. Set FLOW_CONTROL to false and DELETE_ALL to true. Click  button to minimize Messages log. Your screen looks as shown below.



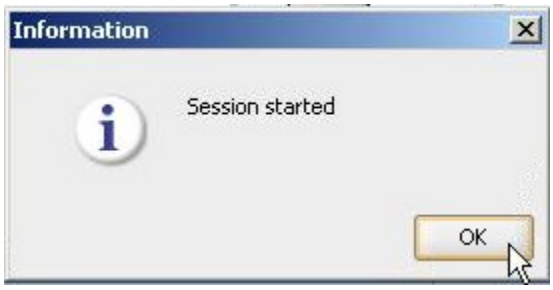
g) Click the Save button to save your interface. If the Locking Object window appears, select “Don’t show this window next time,” and click Yes.

2) Run this interface, and check the content of the TRG_CUSTOMER table.

a) Expand the Interfaces node, right-click the newly created interface PTS Lab 03 – Simple Transformation, and then select Execute.



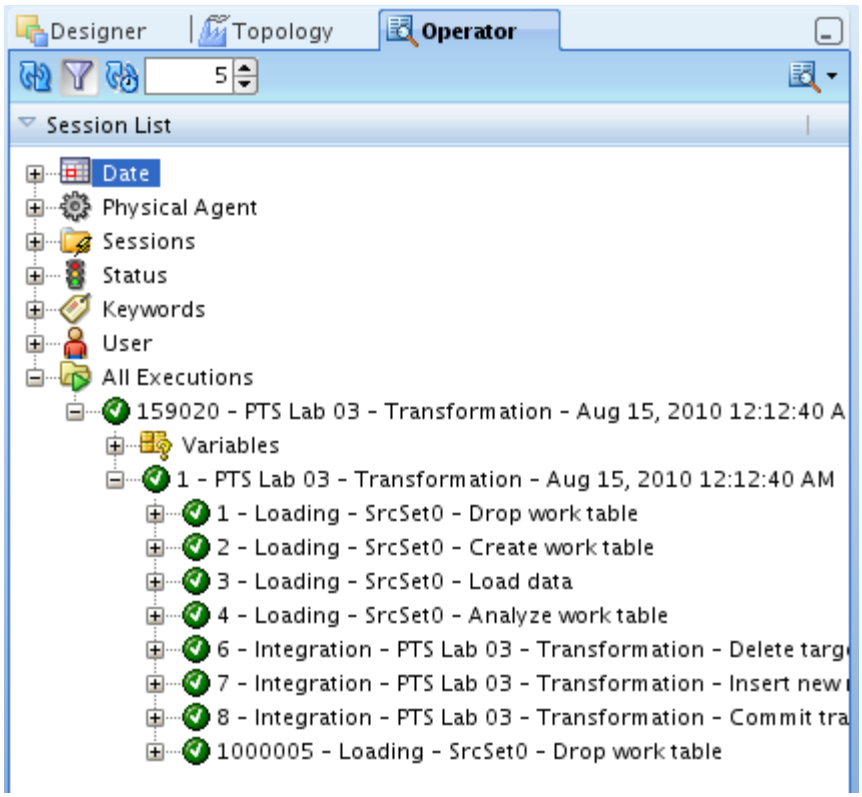
b) Click OK in the Execution window that appears, and then click OK when the Session Started message appears.



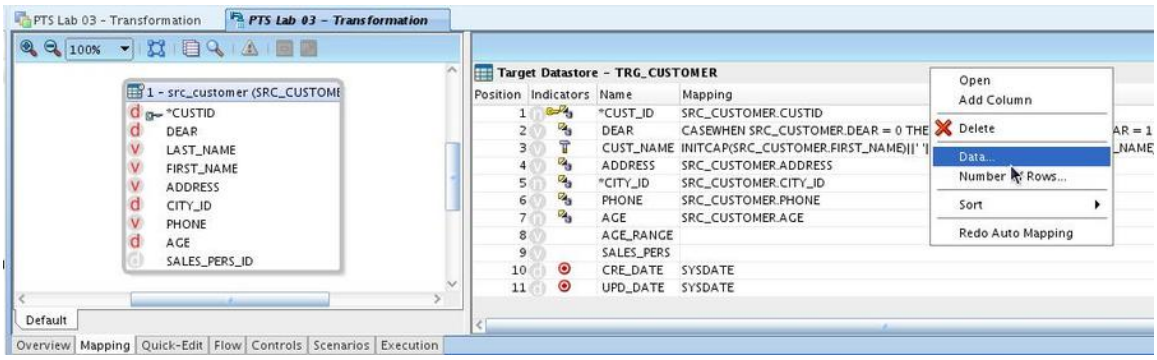
c) Click the Operator tab to open the ODI Operator. The Operator window appears.

Note: In Operator, you may need to click the Refresh button  to view the new session.

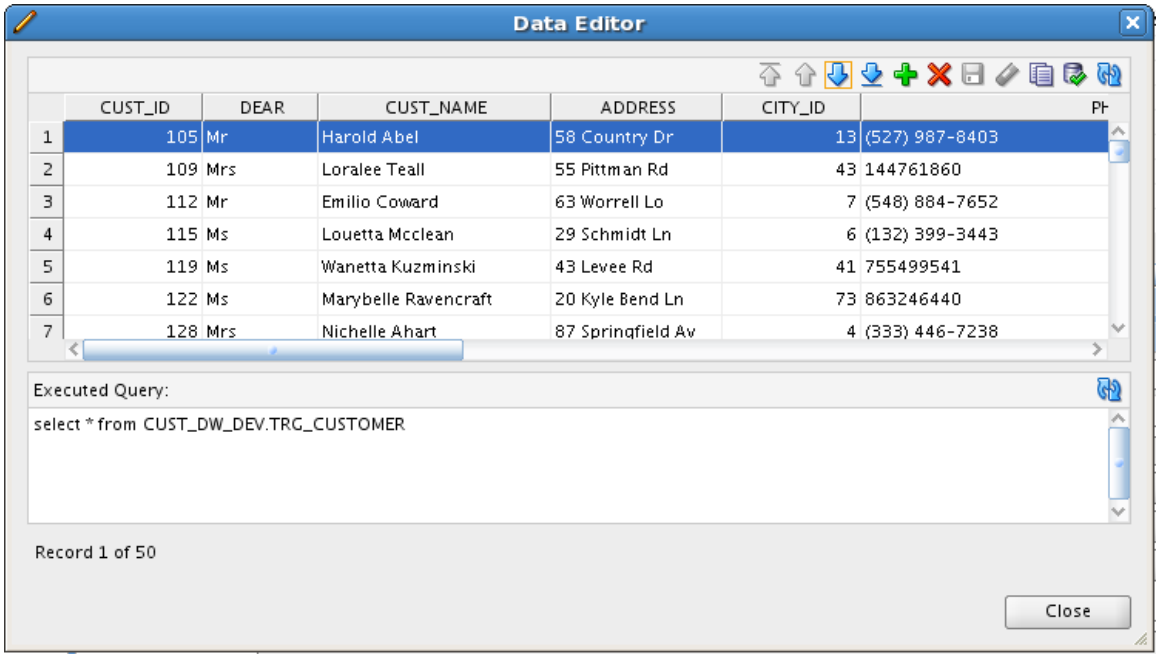
d) Expand the All Executions node. The session called “PTS Lab 01 - Transformation” should appear as complete. Expand this session in the tree view as shown below:



e) In your interface window, click the Mapping tab. Select the TRG_CUSTOMER target datastore (click the name of the datastore), right-click and select Data.



f) A window appears with the loaded data.



g) Verify your data and close this window. Click Save button and then close your interface window. If the Unlocking Object window appears, select "Don't show this window next time" check box and click Yes. Close "PTS Lab 03 – Building First Interface" tab.

Lab 4-1: Creating Master and Work Repository

Introduction

The central component of the architecture is the Oracle Data Integrator Repository. It stores configuration information about the IT infrastructure, metadata of all applications, projects, scenarios, and the execution logs. Many instances of the repository can coexist in the IT infrastructure. The architecture of the repository is designed to allow several separated environments that exchange metadata and scenarios (for example: Development, Test, Maintenance and Production environments). The repository also acts as a version control system where objects are archived and assigned a version number. The Oracle Data Integrator Repository can be installed on an OLTP relational database.

The Oracle Data Integrator Repository is composed of a master repository and several Work Repositories. Several Work repositories can be designated with several Master repositories, if necessary. However, a Work repository can be linked with only one Master repository for version management.

- **Master Repository**: It is the data structure containing information about the topology of the company's IT resources, security, and version management of projects and data models. This repository is stored on a relational database accessible in client/server mode from the different ODI modules. In general, you need only one Master repository.
- **Work Repository**: It is the data structure containing information about data models, projects, and their use. This repository is stored on a relational database accessible in client/server mode from the different ODI modules.

When the Work Repository contains only the execution information (typically for production purposes), it is then called an Execution Repository.

Process Overview

The first steps to setting up Oracle Data Integrator are to create the Master repository, connect to the Master repository, create the Work repository, and then connect to the Work repository.

In this practice, students create and connect to the ODI Master Repository and the ODI Work Repository. Students also create multiple Work repositories that will be used in subsequent practices.

SQL Developer

Create SNPM1 database user for *master* repository
Create SNPW1 database user for *work* repository

Oracle Data Integrator

- Create master repository
  - Create *Master Repository* connection "Master Repository Pr 2-1" with SNPM1 as the user
- Create *work* repository
  - Create *WORKREP_PR2-1* work repository connection with SNPW1 as the user

Scenario

You work as a database administrator for FN Enterprise. In FN Enterprise, you are responsible for performing database management and integration tasks on various resources within the organization. In particular, you are responsible for data loading, transformation, and validation. To set your ODI environment you need to set up the security with your OD and create Master and Work repositories.

Instructions

1) The RDBMS used in this practice is Oracle DB. To connect to your RDBMS, Create the RDBMS schema/user (Oracle XE) for the Master repository. Perform the following steps:

Step	Screen/Page Description	Choices or Values
a.	**Linux**	Connect to RDBMS by selecting Applications >Accessories > Terminal> Type **sql**
b.	**SQL Prompt**	The RDBMS user/schema can be created by executing the following SQL command: create user snpm1 identified by welcome1 default tablespace users temporary tablespace temp; Press Enter button
c.	**SQL Prompt**	Grant connect privileges to the newly created user by executing the following SQL command: grant connect, resource to snpm1; Press Enter button

a)

```
File  Edit  View  Terminal  Tabs  Help
[oracle@pts ~]$ sql

SQL*Plus: Release 11.2.0.1.0 Production on Thu Jul 22 20:06:23 2010

Copyright (c) 1982, 2009, Oracle.  All rights reserved.


Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
With the Partitioning, Oracle Label Security, OLAP, Data Mining,
Oracle Database Vault and Real Application Testing options
```

b)

```
SQL> create user snpm1 identified by welcome1
default tablespace users temporary tablespace temp;
  2
User created.
```

c)

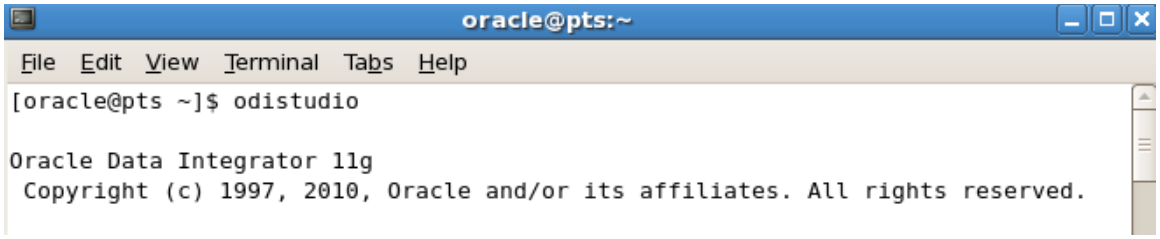
```
SQL> grant connect, resource to snpm1;

Grant succeeded.
```

2) Create the ODI Master repository:

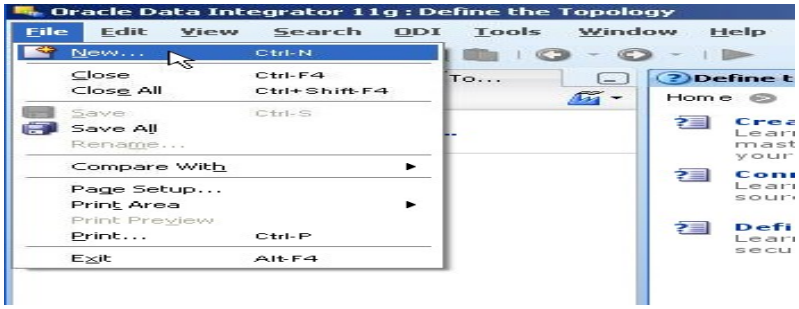
Step	Screen/Page Description	Choices or Values
a.	**Linux**	Start ODI Studio by selecting Applications >Accessories > Terminal> Type **odistudio**
b.	**Oracle Data Integrator**	Open the New Gallery by choosing File > New. In the New Gallery, in the Categories tree, select ODI. Select from the Items list the Master Repository Creation Wizard. Click OK. The Master Repository Creation Wizard appears.
c.	**Master Repository Creation Wizard**	In the Master Repository Creation Wizard, select Oracle JDBC Driver and click OK. Edit the JDBC

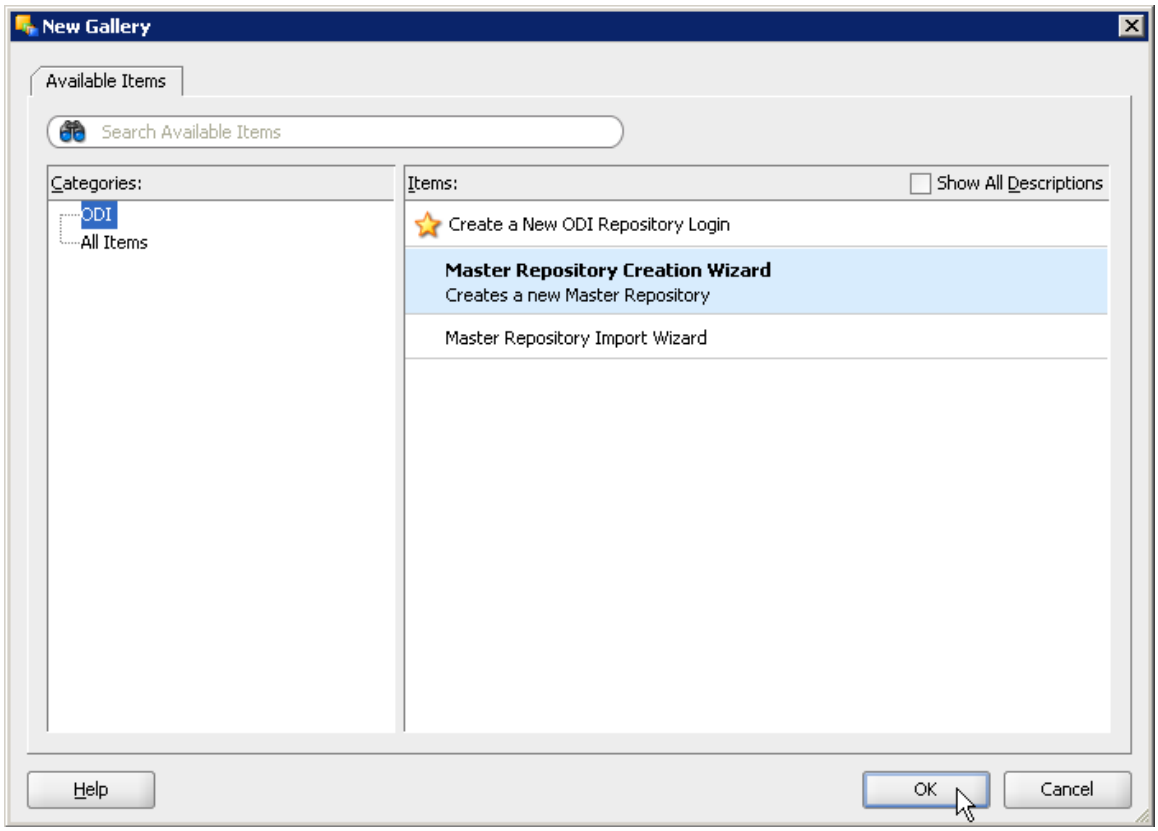
Step	Screen/Page Description	Choices or Values
		URL to read: **jdbc:oracle:thin:@pts.us.oracle.com:1521:XE** Enter the User as **snpm1** and the Password as **welcome1**. Click the Test Connection button and verify successful connection. Click OK. Click Next on the Master Repository Creation Wizard screen.
d.	**Master Repository Creation Wizard**	In the Authentication window, enter Supervisor Password as **welcome1**. Enter **welcome1** again to confirm the password. Click Next.
e.	**Password Storage**	In the Password Storage window, select Internal password Storage, and then click Finish. When Master Repository is successfully created, you will see the Oracle Data Integrator Information message. Click OK. The ODI Master repository is now created.
f.	**Message**	Verify that ODI Master Repository created successfully, and then click OK.

a)

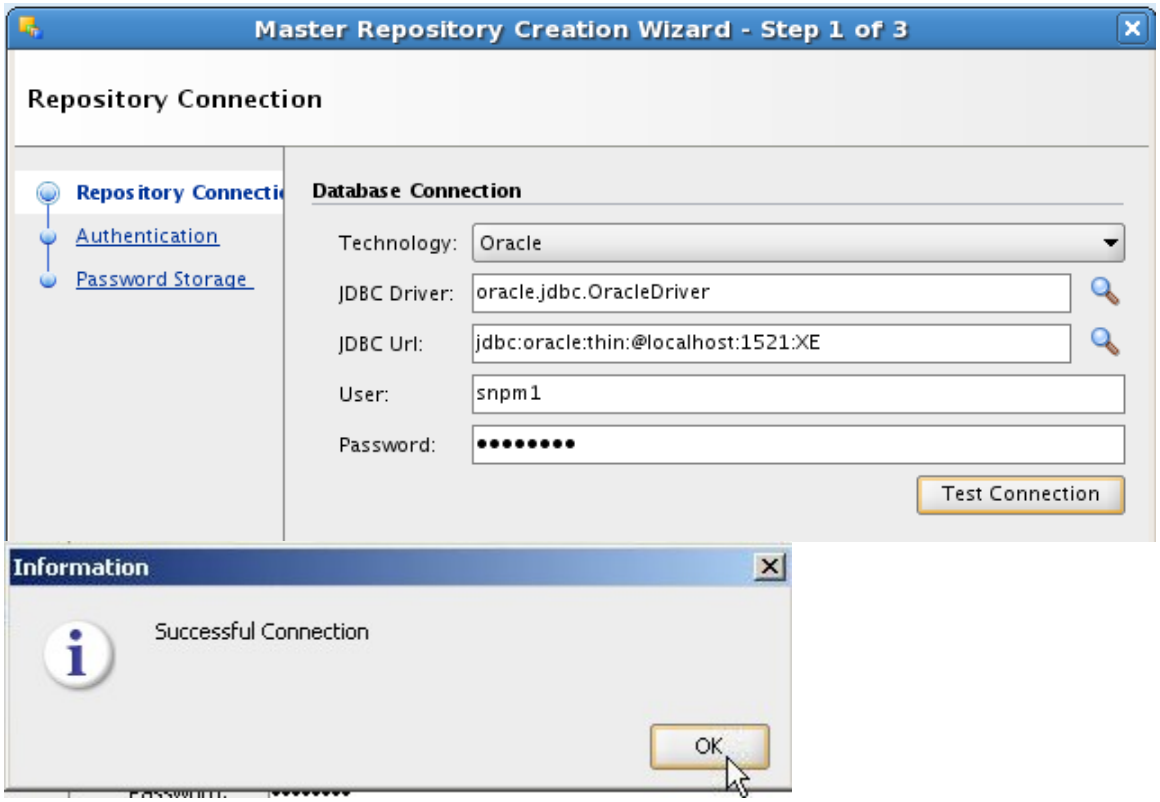


b)

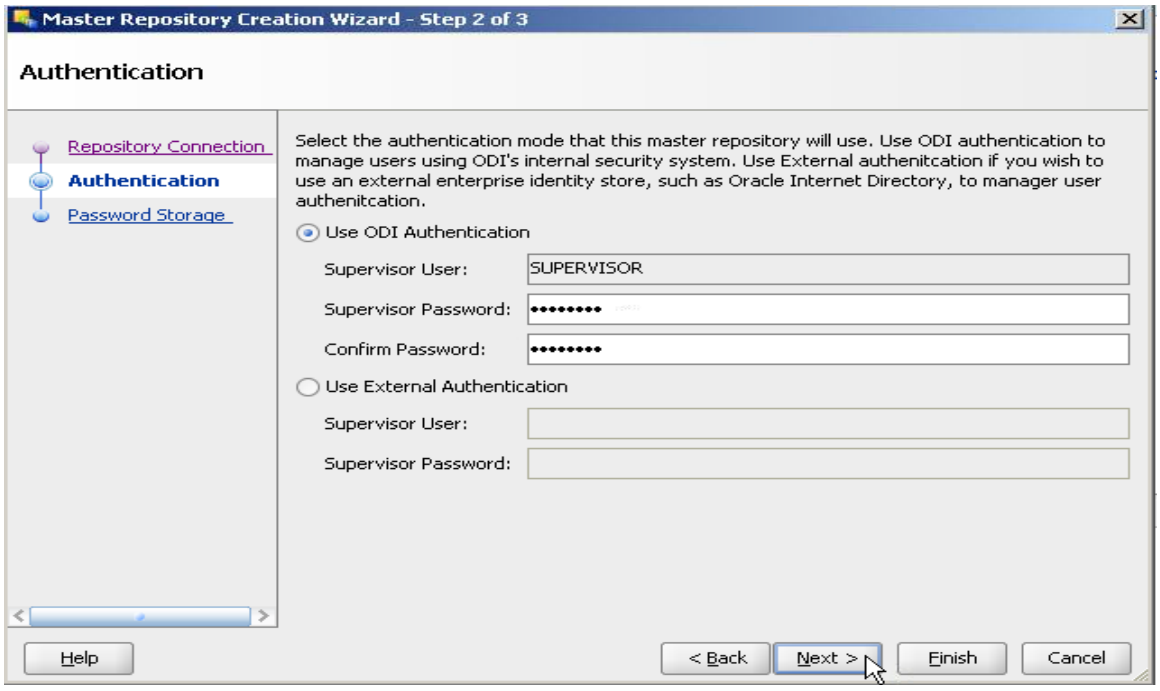



New Gallery
Available Items
Search Available Items
Categories:
ODI
All Items
Items:
Show All Descriptions
Create a New ODI Repository Login
Master Repository Creation Wizard
Creates a new Master Repository
Master Repository Import Wizard
Help
OK
Cancel

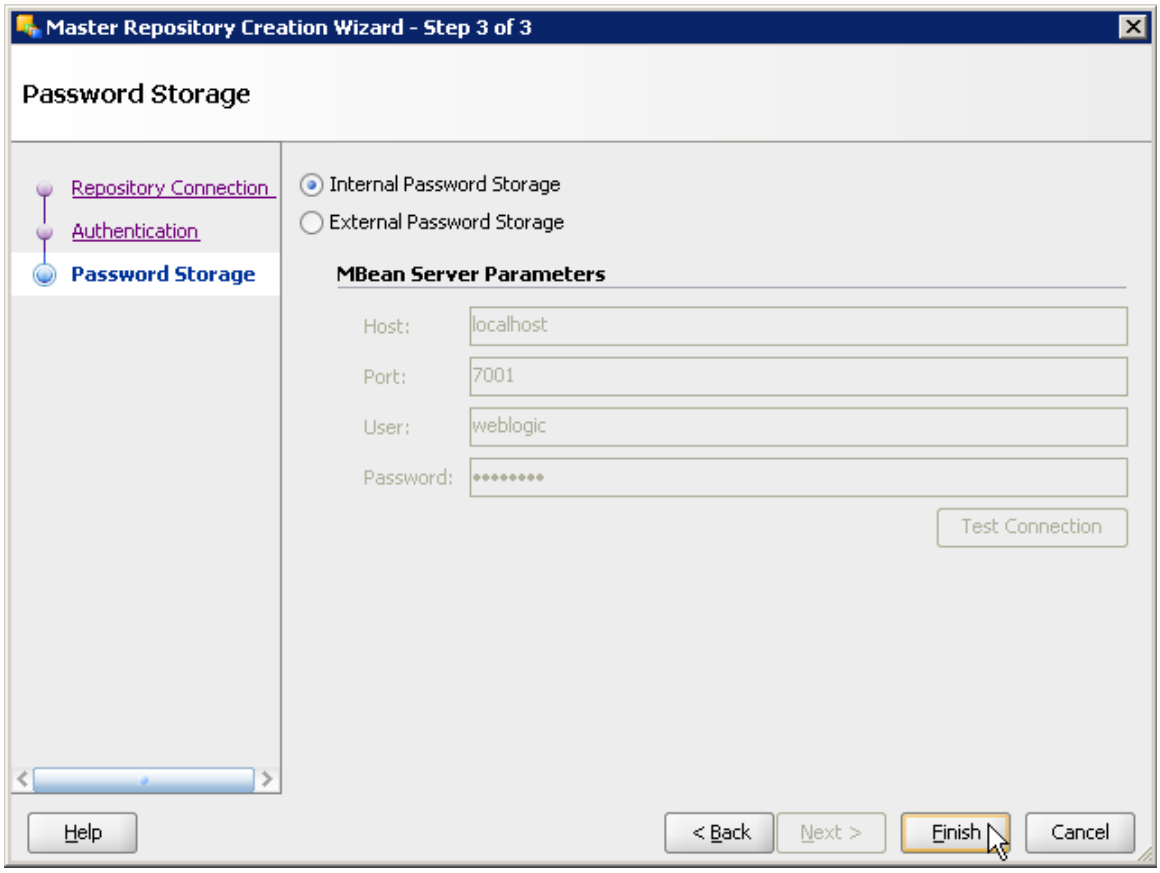
c)

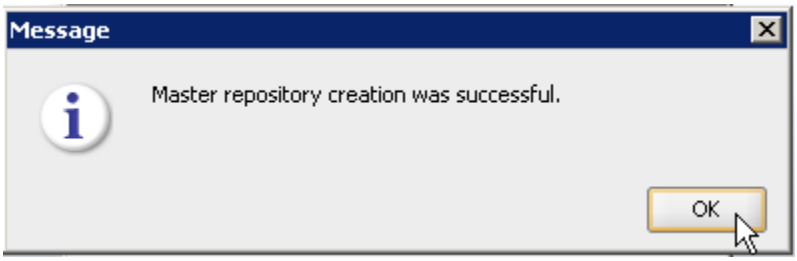

Master Repository Creation Wizard - Step 1 of 3
Repository Connection
Repository Connecti
Authentication
Password Storage
Database Connection
Technology:
Oracle
JDBC Driver:
oracle.jdbc.OracleDriver
JDBC Url:
jdbc:oracle:thin:@localhost:1521:XE
User:
snpm1
Password:
Test Connection
Information
Successful Connection
OK

d)


Master Repository Creation Wizard - Step 2 of 3
Authentication
Repository Connection
Authentication
Password Storage
Select the authentication mode that this master repository will use. Use ODI authentication to manage users using ODI's internal security system. Use External authenitcation if you wish to use an external enterprise identity store, such as Oracle Internet Directory, to manager user authenitcation.
Use ODI Authentication
Supervisor User:
SUPERVISOR
Supervisor Password:
Confirm Password:
Use External Authentication
Supervisor User:
Supervisor Password:
Help
< Back
Next >
Finish
Cancel

e)





3) Connect to the ODI Master repository:

Step	Screen/Page Description	Choices or Values
a.	**Oracle Data Integrator**	Open the New Gallery by choosing File > New. In the New Gallery, in the Categories tree, select ODI. From the Items list select Create a New ODI Repository login.

<table>
<tr><th>Step</th><th>Screen/Page Description</th><th>Choices or Values</th></tr>
<tr><td>b.</td><td>Repository Connections</td><td>Configure Repository Connections with the parameters from the tables provided below. To enter the JDBC URL, click the button next to JDBC URL field and select jdbc:oracle:thin:@<host>:<port>:<sid> as shown in the screenshot, then edit the URL. Select Master Repository only button. Click Test button. Verify successful connection and click OK. Click OK to save the connection.

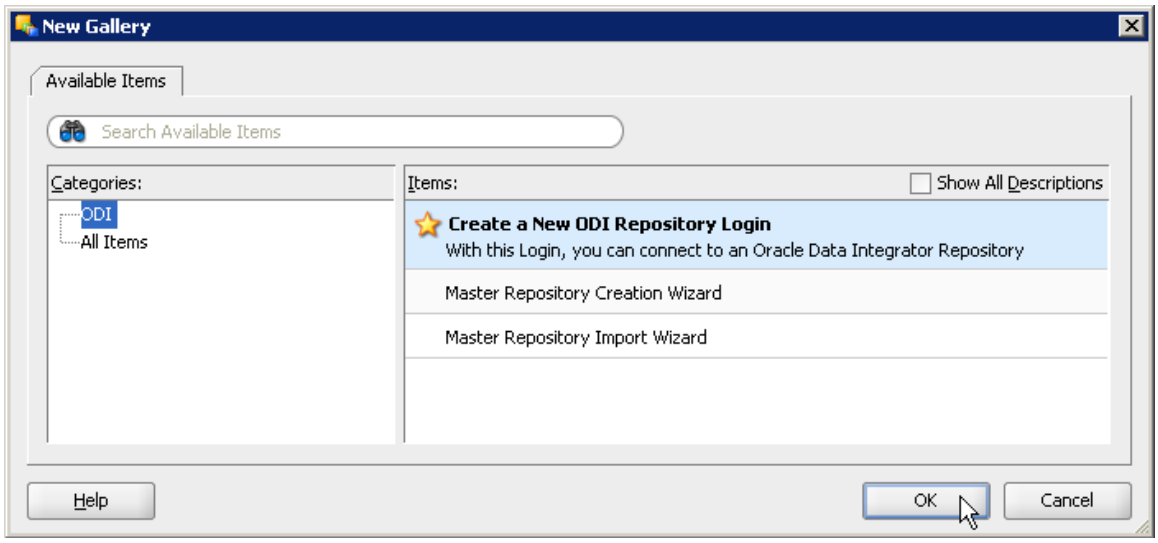
<table>
<tr><td colspan="2">Oracle Data Integrator Connection</td></tr>
<tr><td>Parameter</td><td>Value</td></tr>
<tr><td>Login Name</td><td>Master Repository Pr 2-1</td></tr>
<tr><td>User</td><td>SUPERVISOR</td></tr>
<tr><td>Password</td><td>welcome1</td></tr>
</table>

<table>
<tr><td colspan="2">Database Connection (Master Repository)</td></tr>
<tr><td>Parameter</td><td>Value</td></tr>
<tr><td>User</td><td>snpm1</td></tr>
<tr><td>Password</td><td>welcome1</td></tr>
<tr><td>Driver List</td><td>Oracle JDBC Driver</td></tr>
<tr><td>Driver Name</td><td>oracle.jdbc.OracleDriver</td></tr>
<tr><td>Url</td><td>jdbc:oracle:thin:@pts.us.oracle.com:1521:XE</td></tr>
</table>

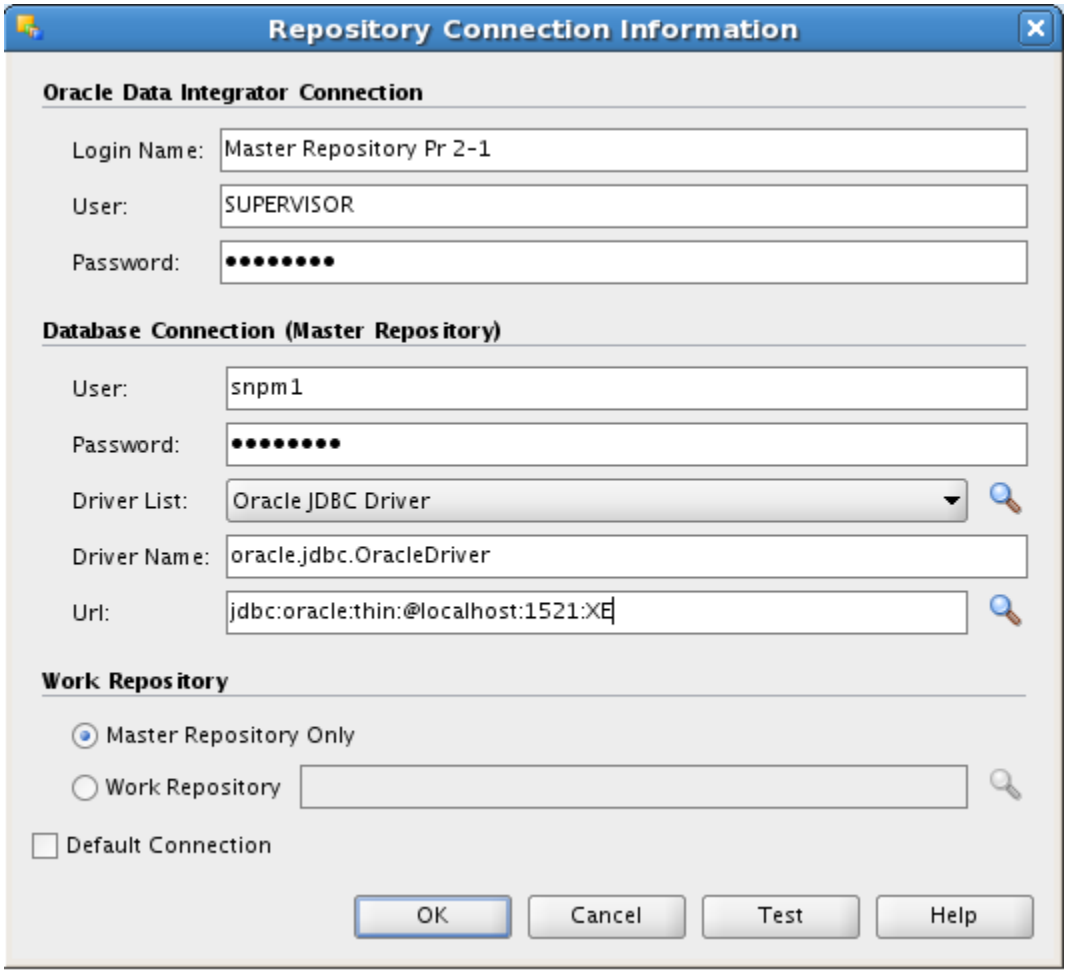
Note: ODI user name (SUPERVISOR) is case-sensitive.</td></tr>
<tr><td>c.</td><td>Oracle data</td><td>Click Connect to Repository. Select the newly created</td></tr>
</table>

Step	Screen/Page Description	Choices or Values
	Integrator	repository connection Master Repository Pr 2-1 from the drop-down list. Click OK. The ODI Topology Manager starts. You are now successfully logged in to the ODI Topology Manager.
d.	**Import Service Description**	Click Topology tab. Click the Repositories tab in the left panel of the Topology Manager. Verify that your newly created Master repository is in the Repositories window.

a)



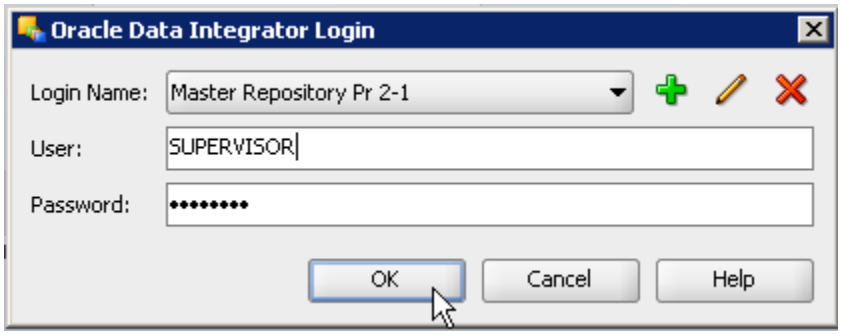
b)


Repository Connection Information
Oracle Data Integrator Connection
Login Name: Master Repository Pr 2-1
User: SUPERVISOR
Password: ••••••••
Database Connection (Master Repository)
User: snpm1
Password: ••••••••
Driver List: Oracle JDBC Driver
Driver Name: oracle.jdbc.OracleDriver
Url: jdbc:oracle:thin:@localhost:1521:XE
Work Repository
Master Repository Only
Work Repository
Default Connection
OK
Cancel
Test
Help

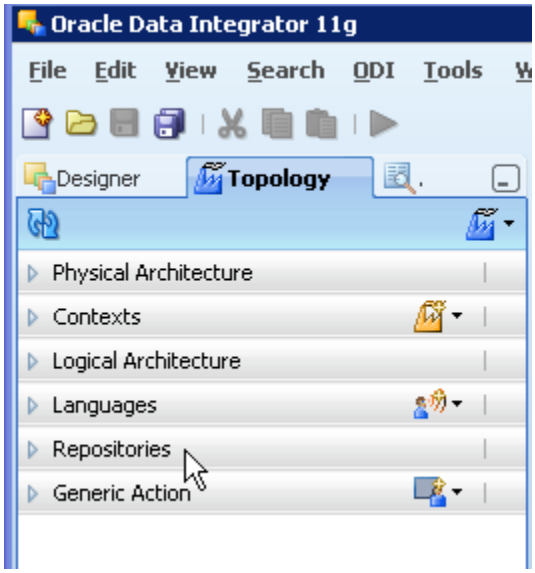

Information
Successful Connection
OK

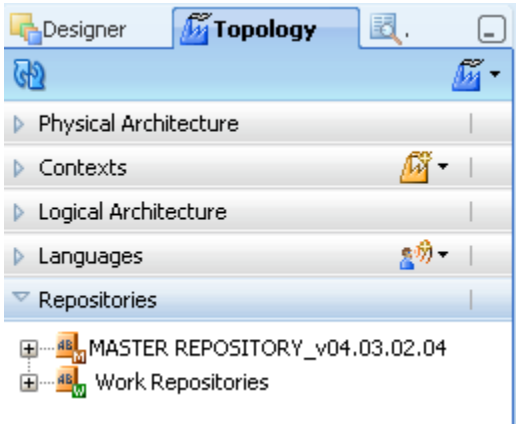
c)


Oracle Data Integrator 11g : Define the Topology
File Edit View Search ODI Tools Window
Designer Operator To...
Connect To Repository...


Oracle Data Integrator Login
Login Name: Master Repository Pr 2-1
User: SUPERVISOR
Password: ••••••••
OK
Cancel
Help

d)


Oracle Data Integrator 11g
File Edit View Search ODI Tools
Designer Topology
Physical Architecture
Contexts
Logical Architecture
Languages
Repositories
Generic Action



4) Create the RDBMS schema/user for the Work repository.

Step	Screen/Page Description	Choices or Values
a.	**Oracle SQL Prompt**	If not opened, open the SQL Prompt. Create the schema by executing the following SQL command: create user snpw1 identified by welcome1 default tablespace users temporary tablespace temp; Press Enter
b.	**Oracle SQL Prompt**	Grant connect privileges to the newly created user by executing the following SQL command: grant connect, resource to snpw1;
c.	**Oracle SQL Prompt**	Run the following command to verify that user snpw1 was successfully created and shown among other users in the list: select * from all_users;

a)

```
SQL> create user snpw1 identified by welcome1
default tablespace users temporary tablespace temp;
  2
User created.
```

b)

```
SQL> grant connect, resource to snpw1;

Grant succeeded.
```

c)

```
SQL> select * from all_users;

USERNAME                          USER_ID CREATED
------------------------------ ---------- ---------
SNPW1                                  93 22-JUL-10
SNPM1                                  92 22-JUL-10
```

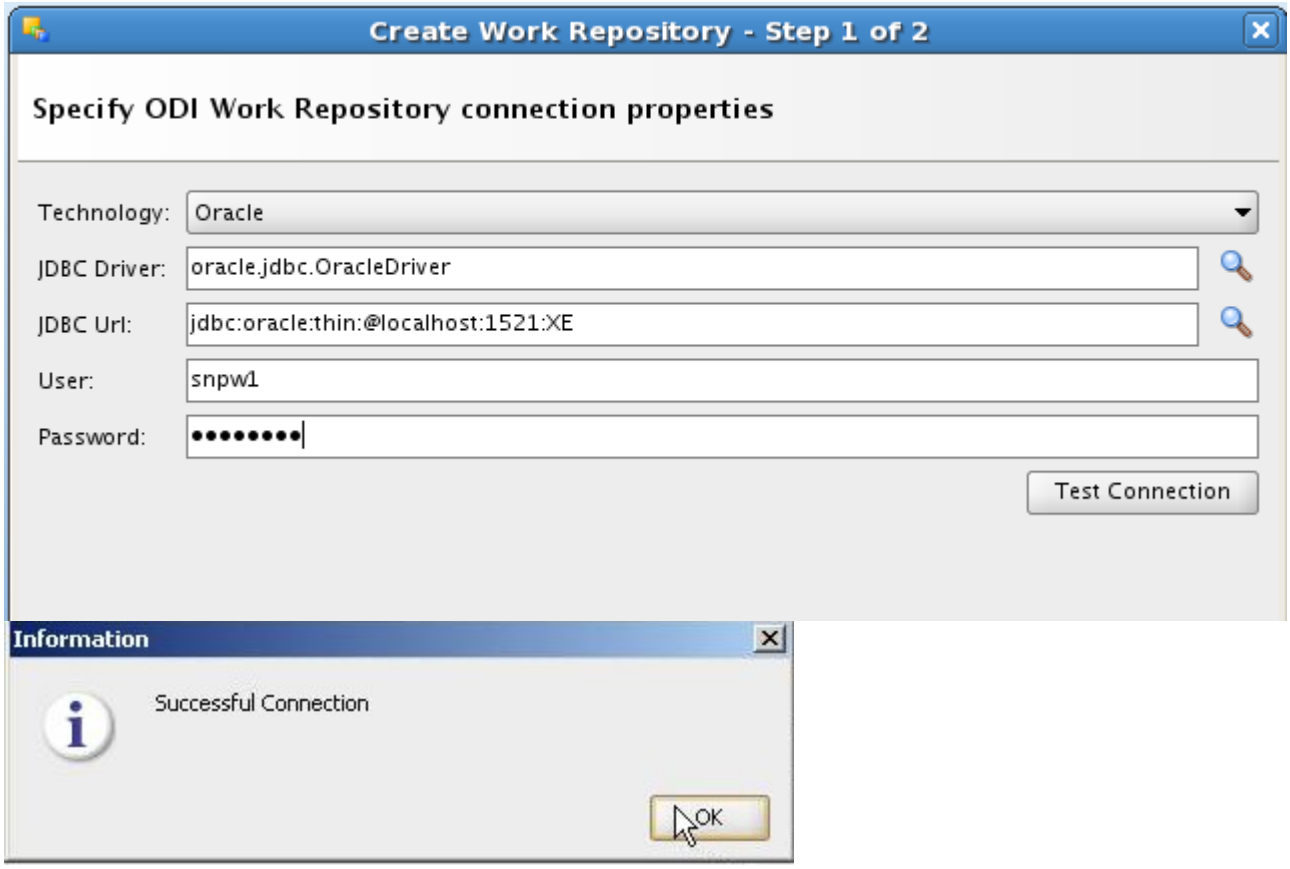
5) Create the ODI Work repository:

Step	Screen/Page Description	Choices or Values
a.	**Oracle Data Integrator**	In ODI, click the Topology Navigator tab and then click to the Repositories panel. Right-click the Work Repositories node and select New Work Repository. The Create Work Repository Wizard opens.
b.	**Specify ODI Work Repository Connection Properties**	In the screen that follows, enter the parameters shown in the following table. Click the Test button. Verify successful connection and click OK. Click Next. *Parameter* / *Value* Technology: Oracle Driver Name: oracle.jdbc.OracleDriver JDBC Url: jdbc:oracle:thin:@pts.us.oracle.com:1521:XE User: snpw1 Password: welcome1
c.	**Specify**	In the Specify Work Repository properties set the ID to

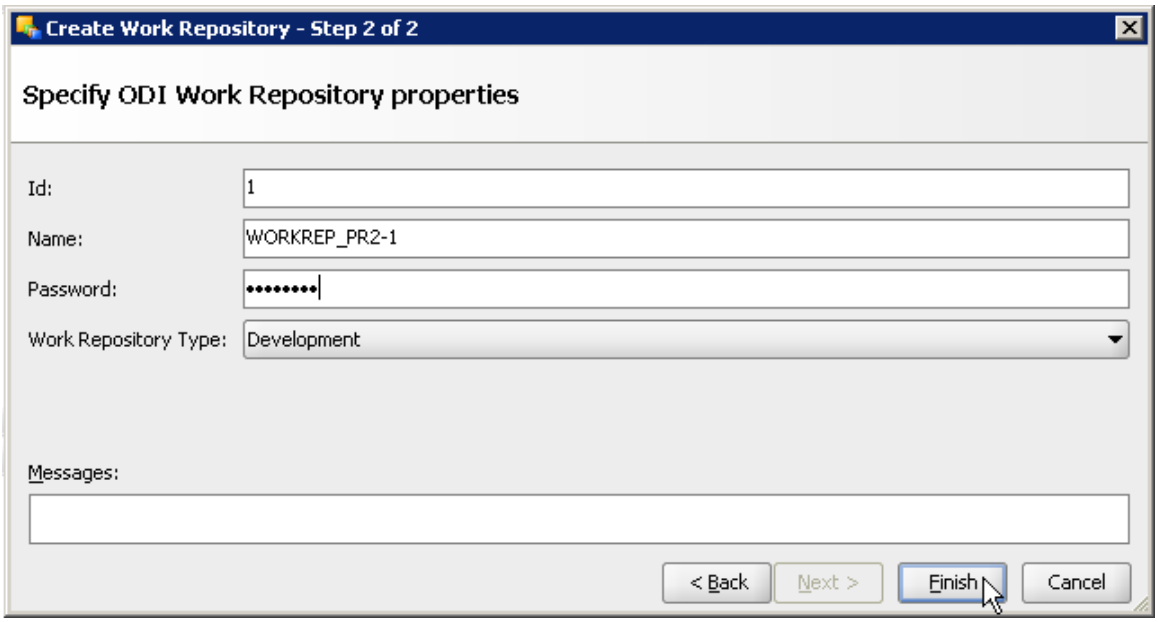
Step	Screen/Page Description	Choices or Values
	Work Repository properties	"1". Set the Name to WORKREP_PR2-1. Enter Password as welcome1. For Work Repository Type, leave Development. Click Finish. Verify that the newly created Work repository is now in the work repositories tree view. **Note:** Development type of repository allows management of design-time objects such as data models and projects (including interfaces, procedures, etc). A development repository includes also the run-time objects (scenarios and sessions). This type of repository is suitable for development environments.
d.	**Create Work Repository Login**	In the Create Work Repository Login window, click Yes. Enter the Login name: WORKREP_PR2-1 as shown on the screenshot. Click OK.
e.	**Oracle Data Integrator**	Verify that Work repository WORKREP_PR2-1 created and shown under the Work Repositories node.

a)

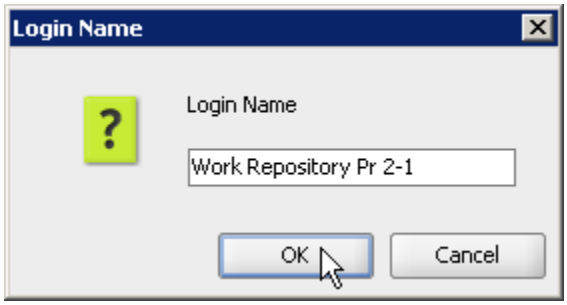
b)


Create Work Repository - Step 1 of 2
Specify ODI Work Repository connection properties
Technology:
Oracle
JDBC Driver:
oracle.jdbc.OracleDriver
JDBC Url:
jdbc:oracle:thin:@localhost:1521:XE
User:
snpw1
Password:
Test Connection
Information
Successful Connection
OK

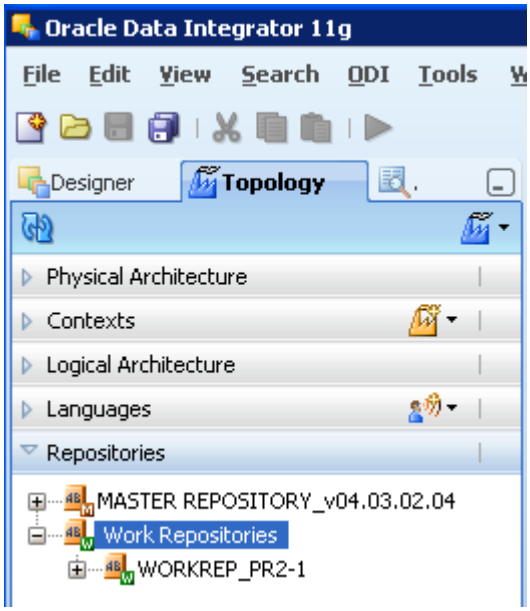
c)


Create Work Repository - Step 2 of 2
Specify ODI Work Repository properties
Id:
1
Name:
WORKREP_PR2-1
Password:
Work Repository Type:
Development
Messages:
< Back
Next >
Finish
Cancel

d)



e)

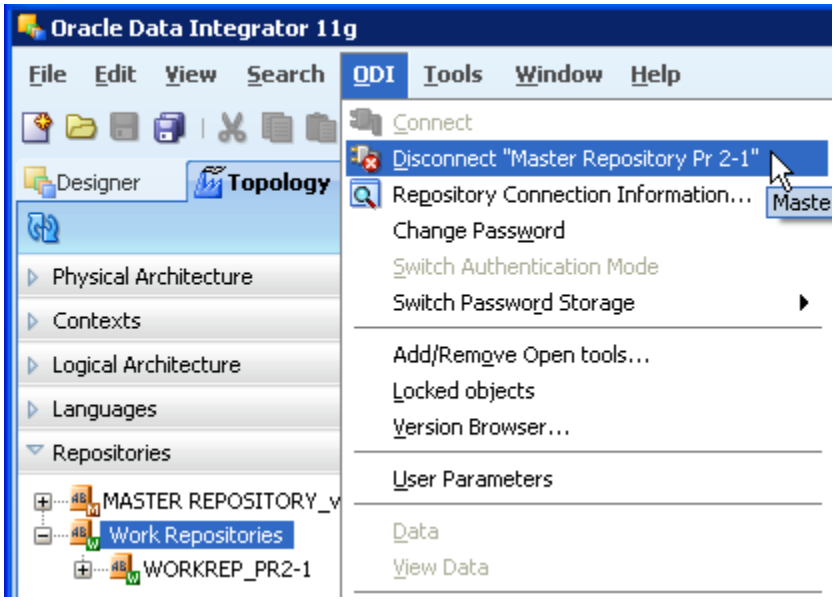


6) Connect to the Work repository:

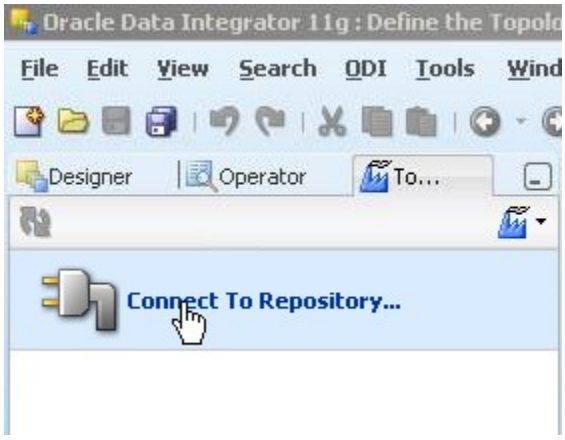
Step	Screen/Page Description	Choices or Values
a.	**Oracle Data Integrator**	Click ODI menu and select Disconnect “Master Repository Pr 2-1”.
b.	**Oracle Data**	Click “Connect To Repository...”

Step	Screen/Page Description	Choices or Values
	Integrator	
c.	**Oracle Data Integrator Login**	Select “Work Repository Pr 2-1” from the Login Name drop-down list. Enter Password: welcome1. Click OK. Click the Designer tab. The following ODI Designer screen appears. You have now successfully created and connected to the ODI Work repository.

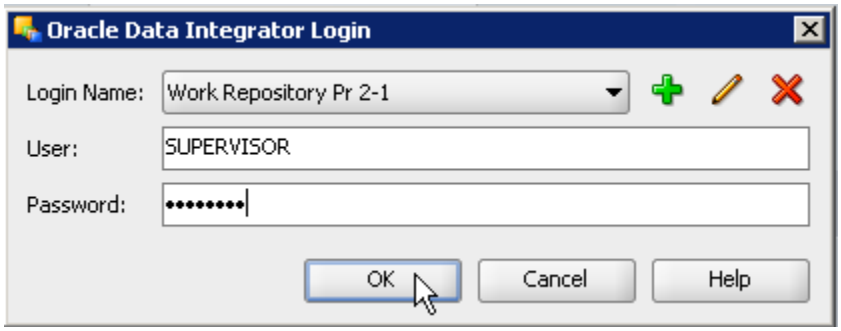
a)

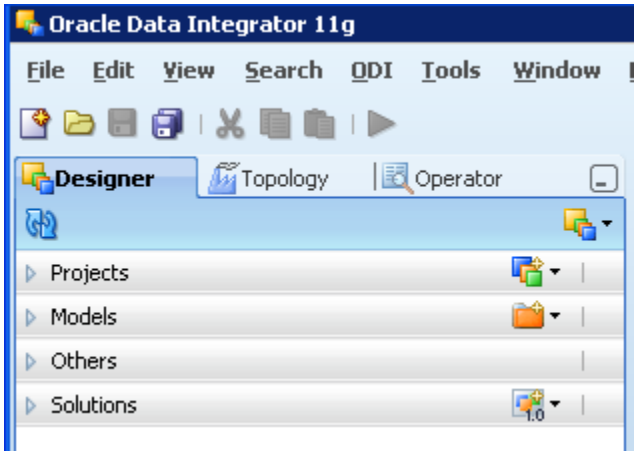


b)



c)


Oracle Data Integrator Login
Login Name:
Work Repository Pr 2-1
User:
SUPERVISOR
Password:
OK
Cancel
Help


Oracle Data Integrator 11g
File
Edit
View
Search
ODI
Tools
Window
Designer
Topology
Operator
Projects
Models
Others
Solutions

Lab 4-2: Creating and Managing Topology

Introduction

The Oracle Data Integrator Topology is the physical and logical representation of the Oracle Data Integrator architecture and components.

Physical Architecture: The physical architecture defines the different elements of the information system, as well as their characteristics taken into account by Oracle Data Integrator. Each type of database (Oracle, DB2, etc.), file format (XML, Flat File), or application software is represented in Oracle Data Integrator by a technology.

The physical components that store and expose structured data are defined as *data servers*. A data server is always linked to a single technology. A data server stores information according to a specific technical logic which is declared into *physical schemas* attached to this data server.

Contexts: Contexts bring together components of the physical architecture (the real Architecture) of the information system with components of the Oracle Data Integrator logical architecture (the Architecture on which the user works).

For example, contexts may correspond to different execution environments (*Development*, *Test* and *Production*) or different execution locations (*Boston Site*, *New-York Site*, and so forth.) where similar physical resources exist.

Logical Architecture: The logical architecture allows a user to identify as a single Logical Schema a group of similar physical schemas - that is containing datastores that are structurally identical - but located in different physical locations. Logical Schemas, like their physical counterpart, are attached to a technology.

All the components developed in Oracle Data Integrator are designed on top of the logical architecture. For example, a data model is always attached to logical schema, and data flows are defined with this model. By specifying a context at run-time, the model's logical schema resolves to a single physical schema, and the data contained in this schema in the data server can be accessed by the integration processes.

Agents: Oracle Data Integrator run-time Agents orchestrate the execution of jobs. The agent executes jobs on demand and to start the execution of scenarios according to a schedule defined in Oracle Data Integrator.

Languages: Languages defines the languages and language elements available when editing expressions at design-time.

Prerequisites

Completion of **Lab 4-1: Creating Master and Work Repository**.

Process Overview

You use the **Topology Navigator** to define the topology of your information system to ODI so that it can be accessed by other ODI modules. In addition, Topology Navigator allows you to manage the repositories. The Topology Navigator stores this information in a Master repository. This information can be used by all the other modules.

The following steps are a guideline to create the topology. You can always modify the topology after an initial setting:

1. Create the contexts corresponding to your different environments.
2. Create the data servers corresponding to the servers used by Oracle Data Integrator.
3. For each data server, create the physical schemas corresponding to the schemas containing data to be integrated with Oracle Data Integrator.
4. Create logical schemas and associate them with physical schemas in the contexts.
5. Create the physical agents corresponding to the standalone or Java EE agents that are installed in your information systems.
6. Create logical agents and associate them with physical agents in the contexts.

Note: Steps 5 and 6 creating agents are the topic of the next lab.

Scenario

You created Master and Work repositories. To continue setting up your ODI infrastructure, you need to create contexts, a data sever, and physical and logical schemas.

Before you begin working on your ODI projects, you need to describe your ODI infrastructure in the topology. As a starting point of this practice, you will use the

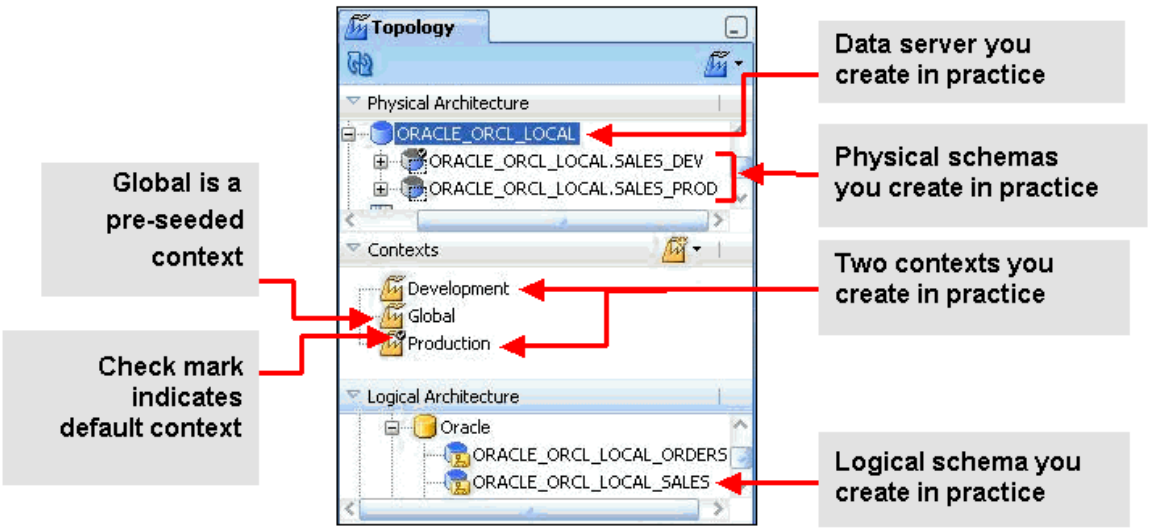
environment provided with ODI installation. The infrastructure includes several servers, and you need to define the following new data server and its attached physical schemas:

Data Server: ORACLE_ORCL_LOCAL

Schemas available in this instance:

Schema	Description
CUST_DW_DEV	Schema storing the target tables for development purposes
CUST_DW_PROD	Schema storing the production target tables
ODI_TMP	Schema used to store ODI temporary objects

Both the SALES_DEV and SALES_PROD physical schemas (corresponding to CUST_DW_DEV and CUST_DW_PROD data schemas) contain identical table structures and correspond to the same logical schema called ORACLE_ORCL_LOCAL_SALES. The mapping for this logical schema depends on the context.



1. Define Production context.

2. Define Development context (a 3rd context, Global, is pre-seeded).

3. Define ORACLE_ORCL_LOCAL data server.

4. Define ODI physical schemas for data server: SALES_DEV, SALES_PROD.

5. Define ORACLE_ORCL_LOCAL_SALES ODI logical schema.

7. Map logical schema to the two physical schemas, in terms of the three contexts.

MYSQL Data Server: Data Server: MYSQL_PTSDB_LOCAL

Schemas available in this instance:

DB	Description
SALES_DEV (TRAINING_SRC)	Schema storing the target tables for development purposes
TEST	Schema used to store ODI temporary objects

1. Define Production context.

2. Define Development context (a 3rd context, Global, is pre-seeded).

3. Define MYSQL_PTSDB_LOCAL data server.

4. Define ODI physical schemas for data server: PTSDB.

5. Define MYSQL_PTSDB_LOCAL_SALES logical schema.

7. Map logical schema to the physical schemas, in terms of the three contexts.

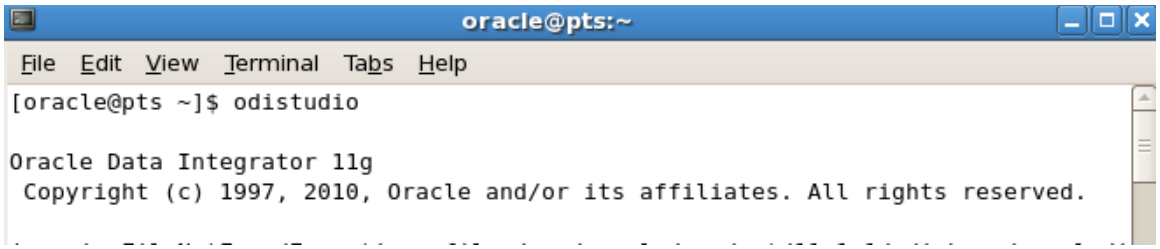
Note: JDBC driver for MYSQL is already installed for this lab. You have to download the latest JDBC driver from mysql website.

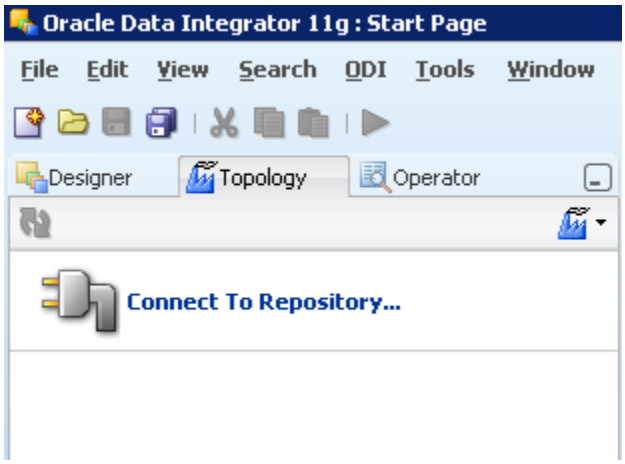
Instructions

1) If not started, start Oracle Data Integrator and open **Master Repository Pr 2-1** connection.

Note: The username and password are case-sensitive.

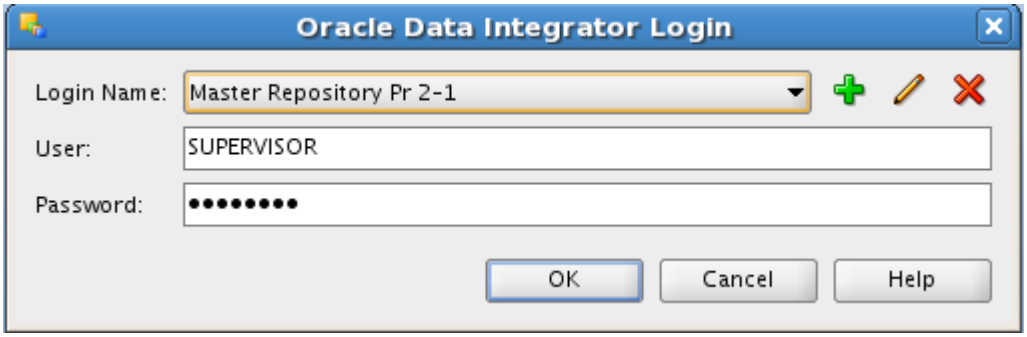
a) Start ODI Studio by selecting Applications >Accessories > Terminal> Type **odistudio**





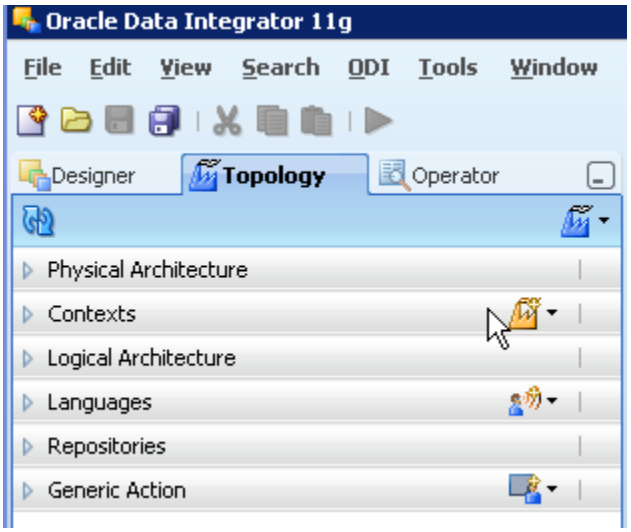
b) Log in with the following details provided below. Click OK.

- Login name: Master Repository Pr 2-1
- User: SUPERVISOR
- Password: welcome1.



2) Create a new context:

a) Click Topology navigator tab, and then click the Context tab.

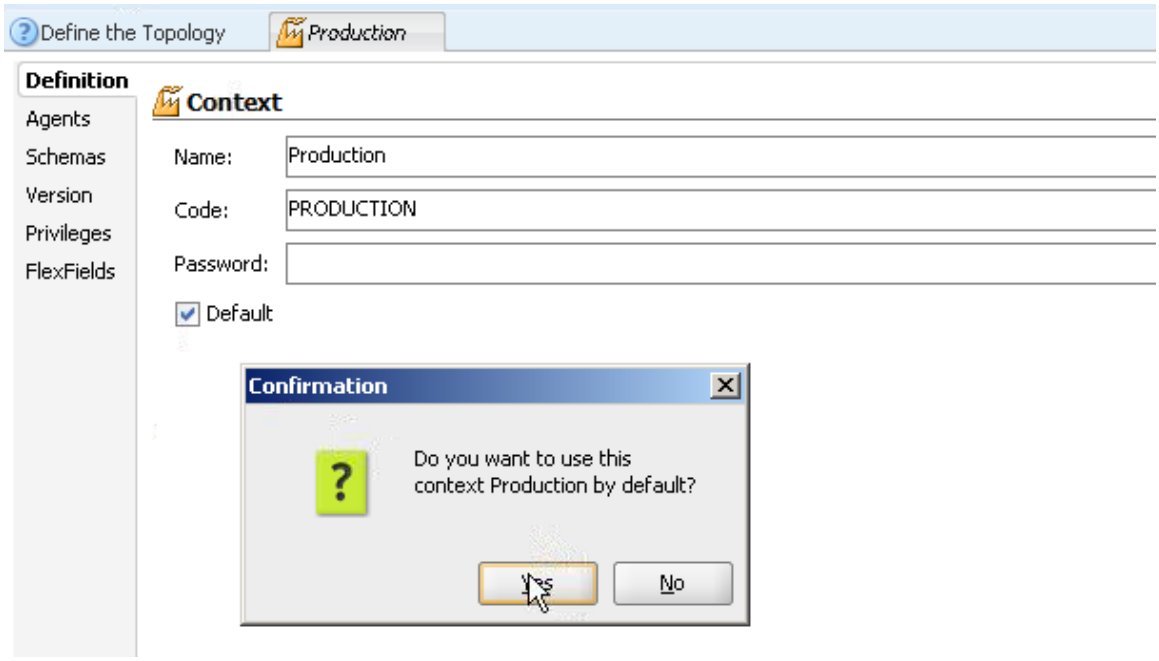


b) Click the New Context icon on the toolbar, and then select New Context.

c) Enter your context parameters:

- **Name:** Production
- **Code:** PRODUCTION
- **Password:** Leave this field empty.
- **Default:** Select this check box, and click Yes to confirm in the pop-up window that appears.

The context window should appear as follows:



d) Click Save button  .

7) Create a new context:

a) Repeat the operations to create another context:

- **Name:** Development
- **Code:** DEVELOPMENT
- **Password:** Leave this field empty.
- **Default:** Leave the check box deselected.

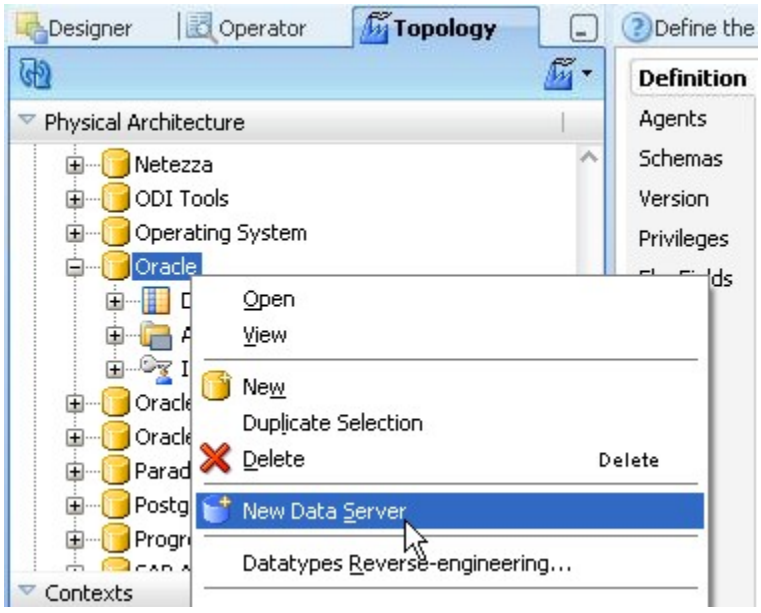
The contexts should appear as follows:

8) Create an ORACLE_ORCL_LOCAL data server:

a) Click the Physical Architecture tab.

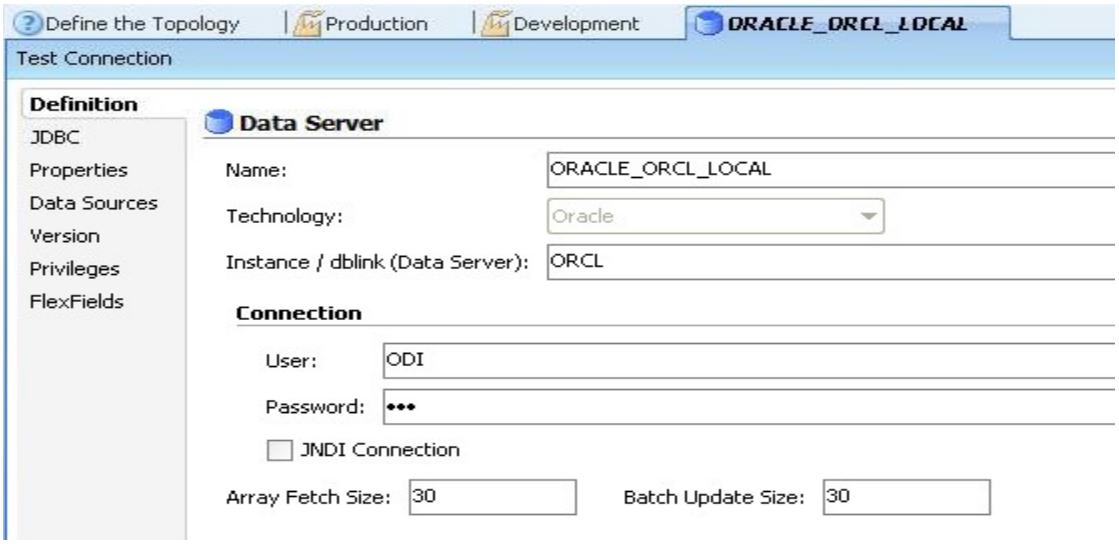
b) Expand the Technologies node.

c) Select the Oracle node, and then right-click and select New Data Server.

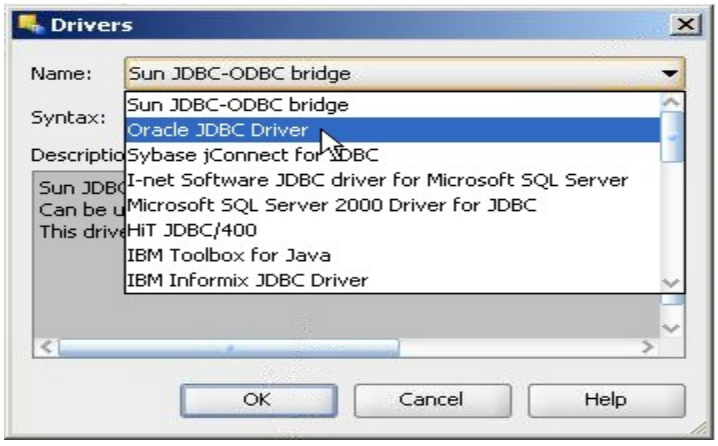


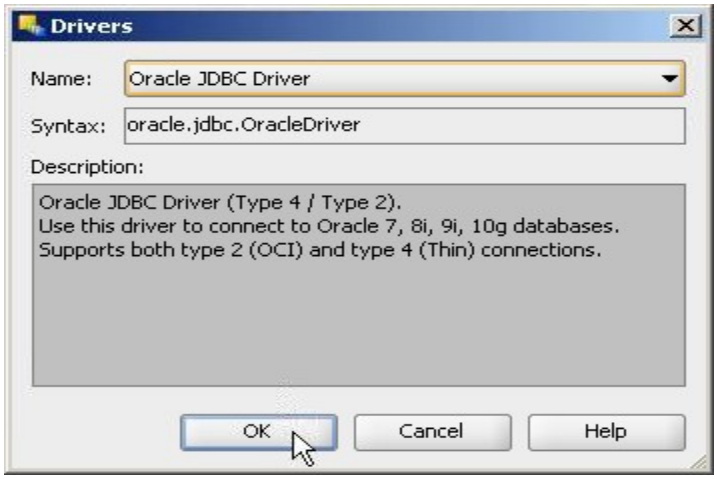
d) Enter the following information on the Definition tab:

- **Name:** ORACLE_ORCL_LOCAL
- **Instance Name:** ORCL
- **User:** ODI
- **Password:** ODI

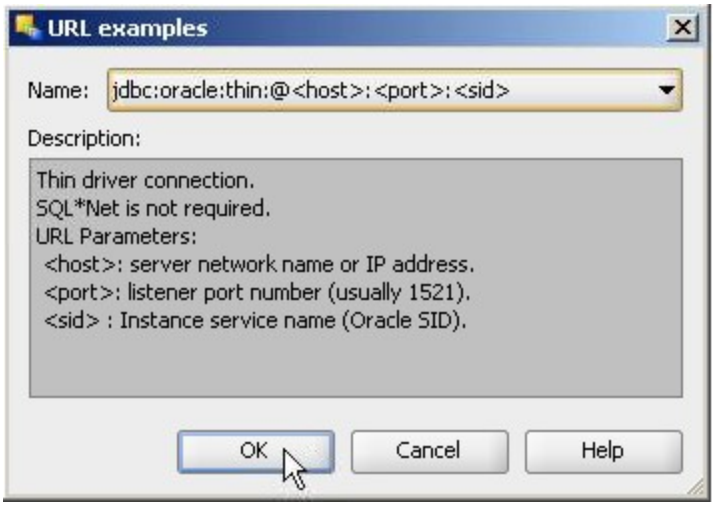


e) Click the JDBC tab. Click the  button at the right of the JDBC Driver field. In the window that appears, select Oracle JDBC Driver, and then click OK.



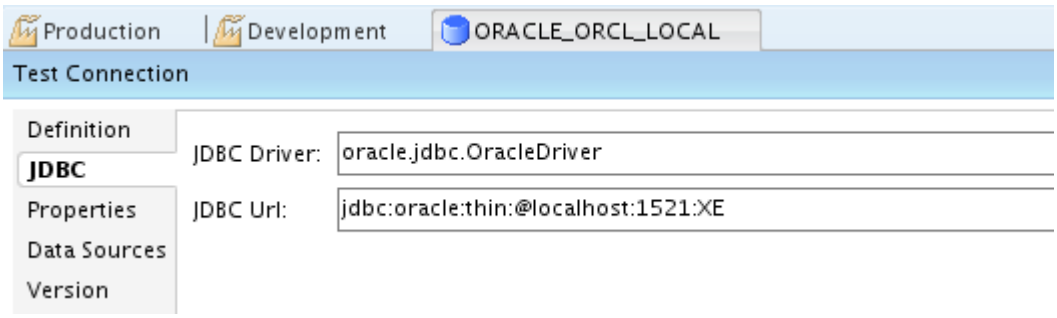


f) Click the  button at the right of the JDBC URL field. In the window that appears, select the first URL, and then click OK.



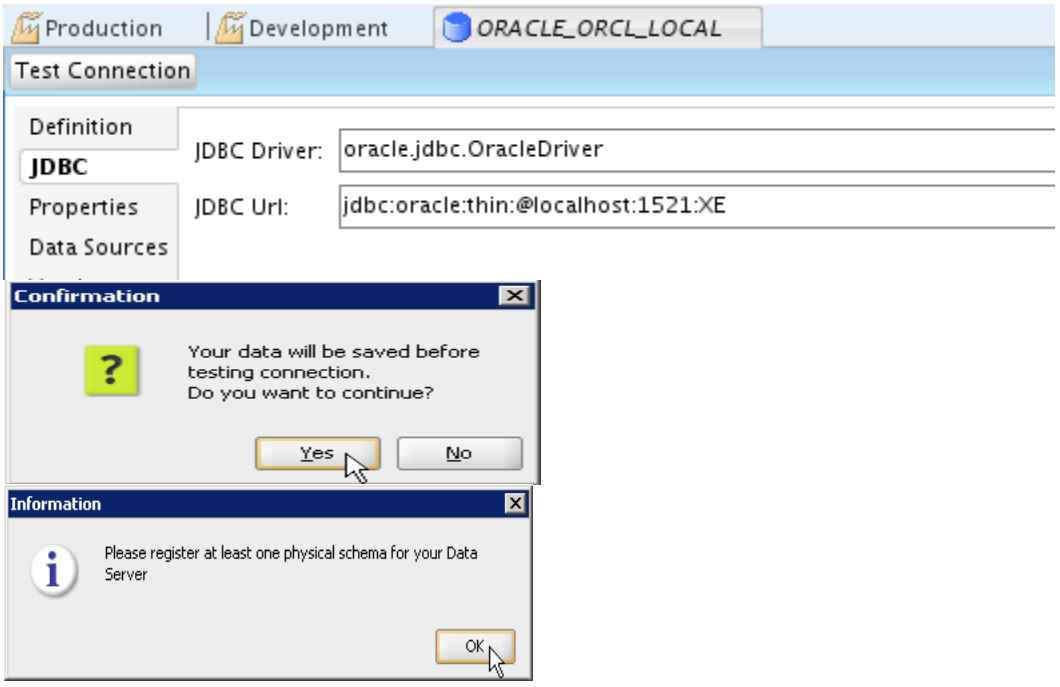
g) Edit the JDBC URL to have the following:
URL: jdbc:oracle:thin:@pts.us.oracle.com:1521:XE

h) The JDBC tab should now appear as follows:

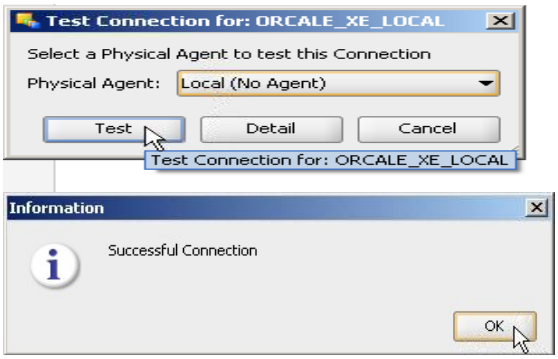


9) Test this data server:

a) Click Test Connection button. Click Yes to confirm saving your data before testing connection. In the Information window, click OK.



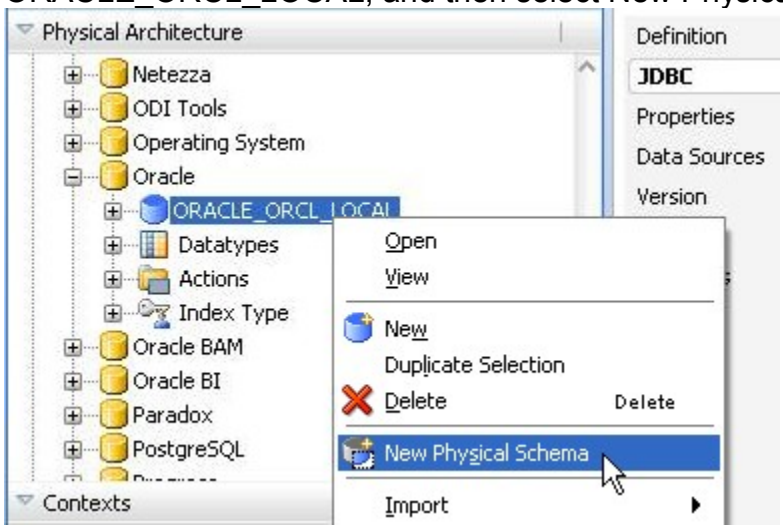
In the dialog box that appears, click the Test button. Click OK.



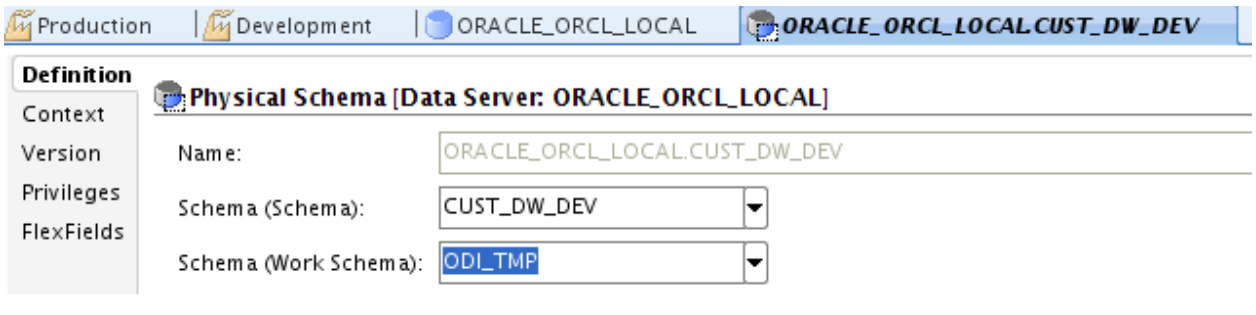
10) Create a physical schema for this data server: ORACLE_ORCL_LOCAL.CUST_DW_DEV

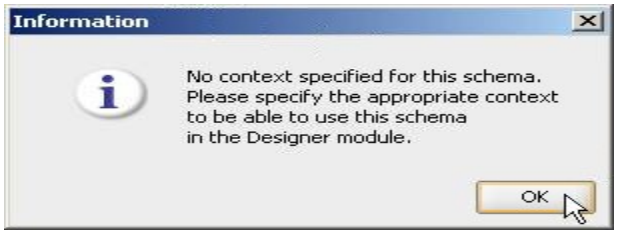
- **Data Schema:** CUST_DW_DEV
- **Work Schema:** ODI_TMP
- **Default check box:** *Selected*

a) Expand Oracle node. Right-click the newly created data server ORACLE_ORCL_LOCAL, and then select New Physical Schema.

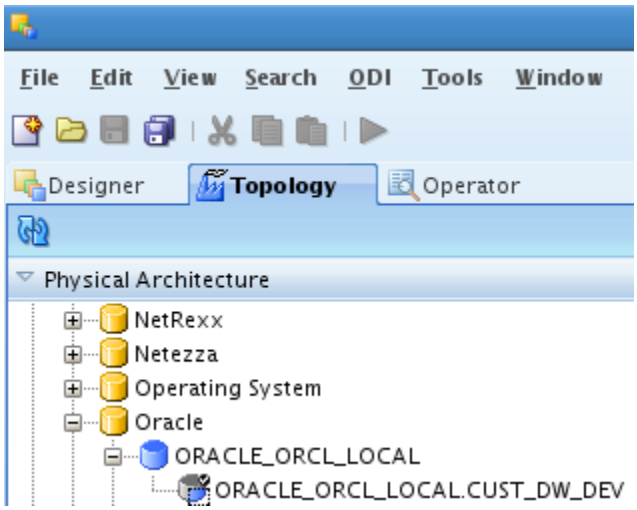


b) In the new window that appears, select CUST_DW_DEV from the Schema (Schema) drop-down list, and then select ODI_TMP from the Schema (Work Schema) drop-down list. Verify that the Default check box is selected, and leave all other fields unchanged. Click Save button  . Click OK in the Information window that appears.





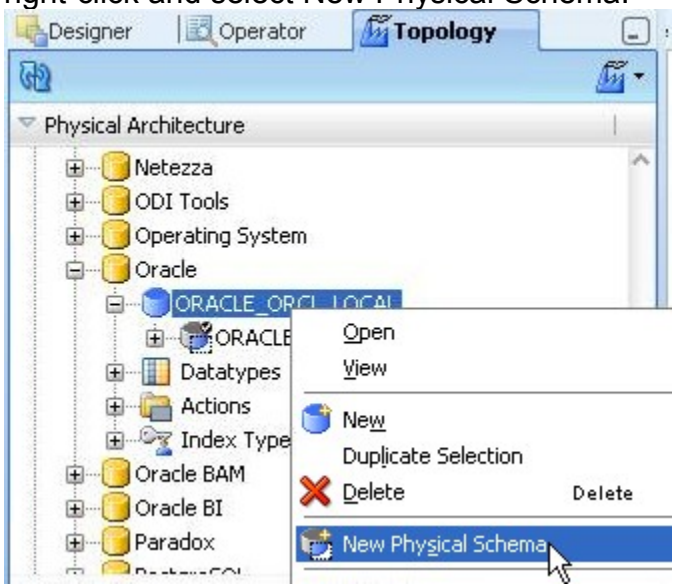
Expand: Oracle > ORACLE_ORCL_LOCAL. The Physical schema ORACLE_ORCL_LOCAL.CUST_DW_DEV appears in the tree view:



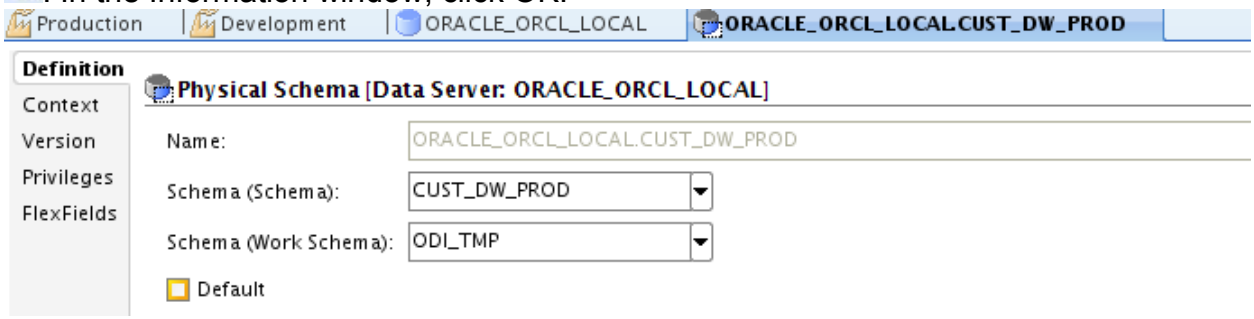
11) Create a physical schema ORACLE_ORCL_LOCAL.CUST_DW_PROD for the ORACLE_ORCL_LOCAL data server:

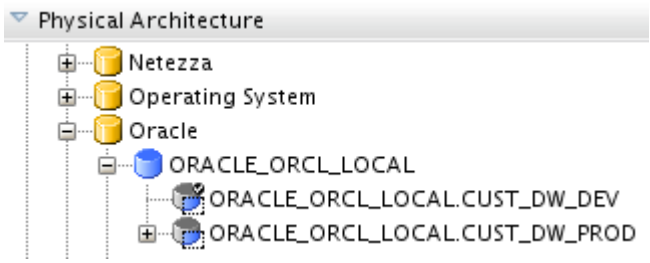
- **Data Schema:** CUST_DW_PROD
- **Work Schema:** ODI_TMP
- **Default Schema:** *Not* selected

a) Select the ORACLE_ORCL_LOCAL data server in the tree view, and then right-click and select New Physical Schema.



b) In the new window that appears, select CUST_DW_PROD from the Schema (Schema) drop-down list, and then select ODI_TMP from the Schema (Work Schema) drop-down list. Check that the Default check box is *not* selected, and leave all other fields unchanged. Click Save button . In the Information window, click OK.

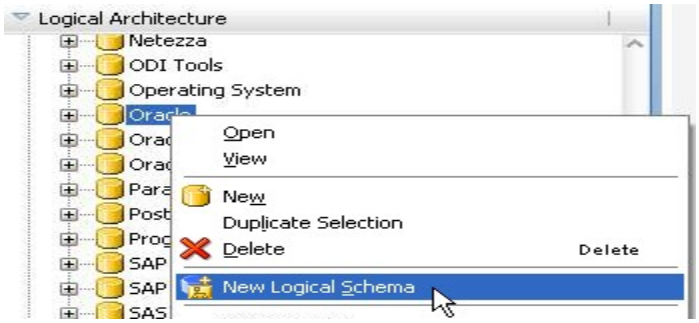




12) Create a logical schema ORACLE_ORCL_LOCAL_SALES and map this schema in the different contexts.

- **Development Context:** ORACLE_ORCL_LOCAL. CUST_DW_DEV
- **Production Context:** ORACLE_ORCL_LOCAL. CUST_DW_PROD
- **Global Context:** ORACLE_ORCL_LOCAL. CUST_DW_DEV

a) Select the Logical Architecture tab and expand the Technologies node. Select the Oracle node, and then right-click and select New Logical Schema.



Enter the name of the logical schema ORACLE_ORCL_LOCAL_SALES. To map this logical schema to physical schemas in different contexts, select the appropriate physical schema in front of each context, as shown below. Click Save button.

13) Create an MYSQL_PTSDB_LOCAL data server:

a) Click the Physical Architecture tab.

b) Expand the Technologies node.

c) Select the MYSQL node, and then right-click and select New Data Server.

d) Enter the following information on the Definition tab:

- **Name:** MYSQL_PTSDB_LOCAL
- **User:** pts
- **Password:** oracle

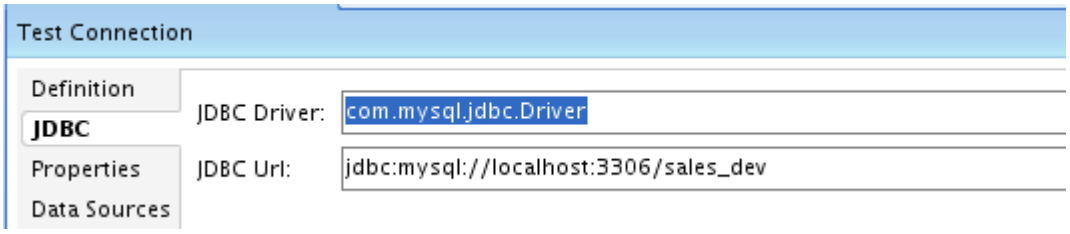
e) Click the JDBC tab.

f) Enter the JDBC Driver and URL to have the following:

DRIVER: com.mysql.jdbc.Driver

URL: jdbc:mysql://localhost:3306/sales_dev

g) The JDBC tab should now appear as follows:



14) Test this data server:

a) Click Test Connection button. Click Yes to confirm saving your data before testing connection. In the Information window, click OK.

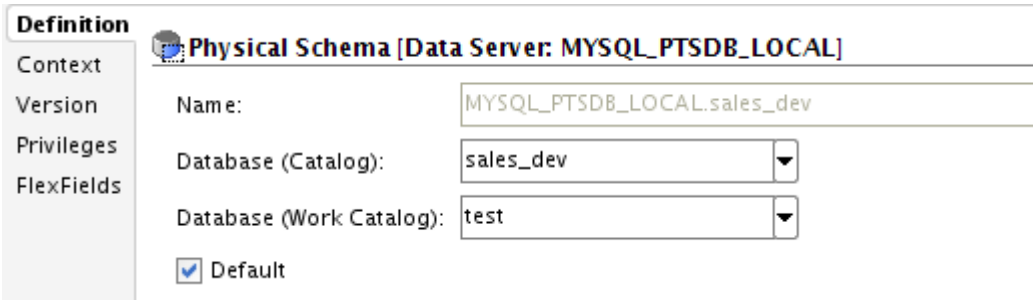
In the dialog box that appears, click the Test button. Click OK.

15) Create a physical schema (Database) for this data server: MYSQL_PTSDB_LOCAL.ptsdb

- **Database (Catalog):** sales_dev
- **Database (Work Catalog):** test
- **Default check box:** *Selected*

a) Expand MySQL node. Right-click the newly created data server MYSQL_PTSDB_LOCAL, and then select New Physical Schema.

b) In the new window that appears, select sales_dev from the Database (Schema) drop-down list, and then select test from the Database (Work Schema) drop-down list. Verify that the Default check box is selected, and leave all other fields unchanged. Click Save button . Click OK in the Information window that appears.

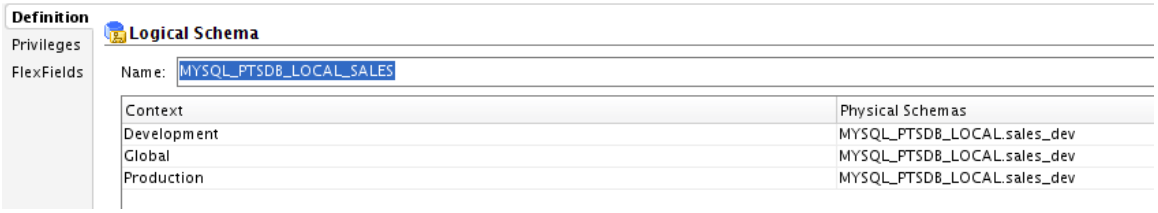


16) Create a logical schema MYSQL_PTSDB_LOCAL_SALES and map this schema in the different contexts.

- **Development Context:** MYSQL_PTSDB_LOCAL. sales_dev
- **Production Context:** MYSQL_PTSDB_LOCAL. sales_dev
- **Global Context:** MYSQL_PTSDB_LOCAL. sales_dev

a) Select the Logical Architecture tab and expand the Technologies node. Select the MYSQL node, and then right-click and select New Logical Schema.

b) Enter the name of the logical schema MYSQL_PTSDB_LOCAL_SALES. To map this logical schema to physical schemas in different contexts, select the appropriate physical schema in front of each context, as shown below. Click Save button.



Lab 4-3: Creating Agents

Introduction

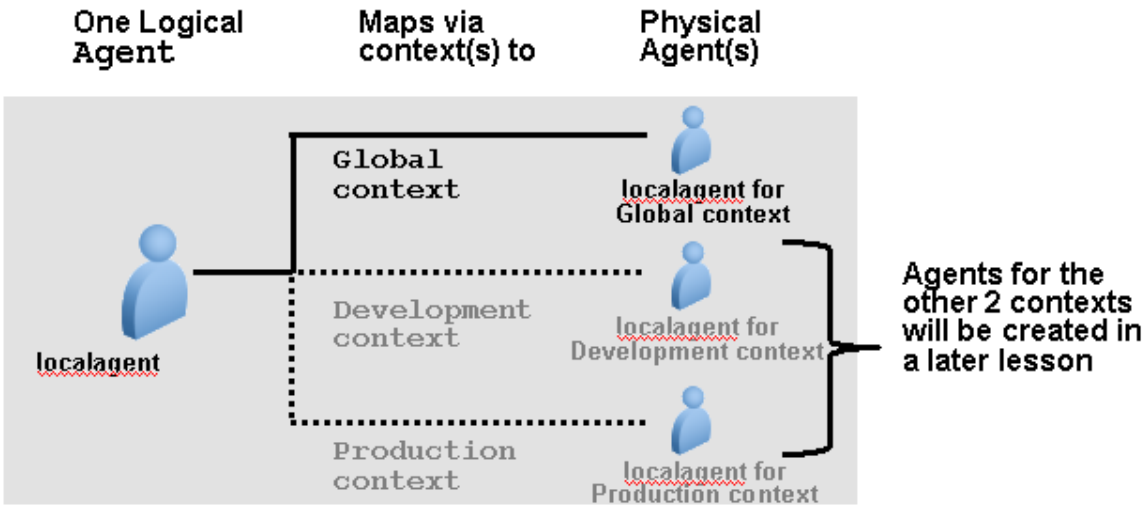
Oracle Data Integrator run-time Agents orchestrate the execution of jobs. These agents are Java components. The run-time agent functions as a *listener* and a *scheduler* agent. The agent executes jobs on demand (model reverses, packages, scenarios, interfaces, and so forth), for example when the job is manually launched from a user interface or from a command line. The agent is also to start the execution of scenarios according to a schedule defined in Oracle Data Integrator.

There are two types of Oracle Data Integrator agents. A **standalone agent** runs in a separate Java Virtual Machine (JVM) process. It connects to the work repository and to the source and target data servers via JDBC. A **Java EE agent** is deployed as a web application in a Java EE application server. The Java EE agent can benefit from all the features of the application server.

A physical agent corresponds to a single standalone agent or a Java EE agent. Similarly to schemas, physical agents having an identical role in different environments can be grouped under the same logical agent. A logical agent is related to physical agents through contexts. When starting an execution, you indicate the logical agent and the context. Oracle Data Integrator will translate this information into a single physical agent that will receive the execution request.

Process Overview

A common task that is performed using ODI is to set up and install ODI Agent as a service. After the ODI scenarios are created, they can be scheduled and orchestrated using an ODI Agent, which is a lightweight Java process that orchestrates the execution of ODI scenarios. In this practice, you learn how to set up and install an ODI Agent, which will then be used in subsequent practices for orchestration of the execution of ODI objects.



1. Run encode password to generate an encrypted password string.
2. Edit odiparams.bat, inserting the encrypted password.
3. Execute agent.bat, to create/install/start an agent named localagent.
4. In ODI, define a physical agent named localagent.
5. In ODI, define a logical agent named localagent, mapping it to the physical agent named localagent, for the Global context.

Scenario

In the previous labs, you set up your topology by creating Master and Work repositories, contexts, data severs, and physical and logical schemas. Now you complete setting up your ODI environment by installing an ODI Agent as a background service.

Instructions

1) To set up an ODI Agent, perform the following steps:

Step	Screen/Page Description	Choices or Values
a.	Linux Shell and text editor	Open new terminal window and go to Lab4 directory by typing command: > cd /home/oracle/PTS_Labs/Lab4 To open param files in a text editor, type following command: > gedit Lab4_odiparams.sh Leave this editor open; you will run a batch file from a Command window and return to this text editor to copy the results into the Lab4_odiparms.sh file. Explanation: You need to edit the Lab4_odiparms.sh file to set the repository connection information for the ODI Agent to use. The password information is stored as an encrypted string. You will generate the encrypted string in a Command window.
b.	Command Prompt	Leave the text editor open, and open the terminal (Applications >Accessories > Terminal> Type **odihome**) and change the directory to " **cd bin**" Type **pwd** the following directory path should be shown **/app/Oracle/Middleware/Oracle_ODI/oracledi/agent/bin**
c.	Command Prompt	To generate the encrypted password string, you will be using the agent command: *encode <password>.* Because your password is the word "welcome1", enter and execute the following command in the Command window: **./encode.sh welcome1** Keep the Command window open, as you will be returning to it after editing the **Lab4_odiparms.sh** file.
d.	Command Prompt and text editor	Copy the generated encrypted password from the Command window (highlight the password with your mouse, from the Command window's pull-down menu, select Edit > Copy) and insert it into the Lab4_odiparms.sh file as the value for the ODI_MASTER_ENCODED_PASS parameter. Verify and, if necessary, edit settings for *other* parameters from the

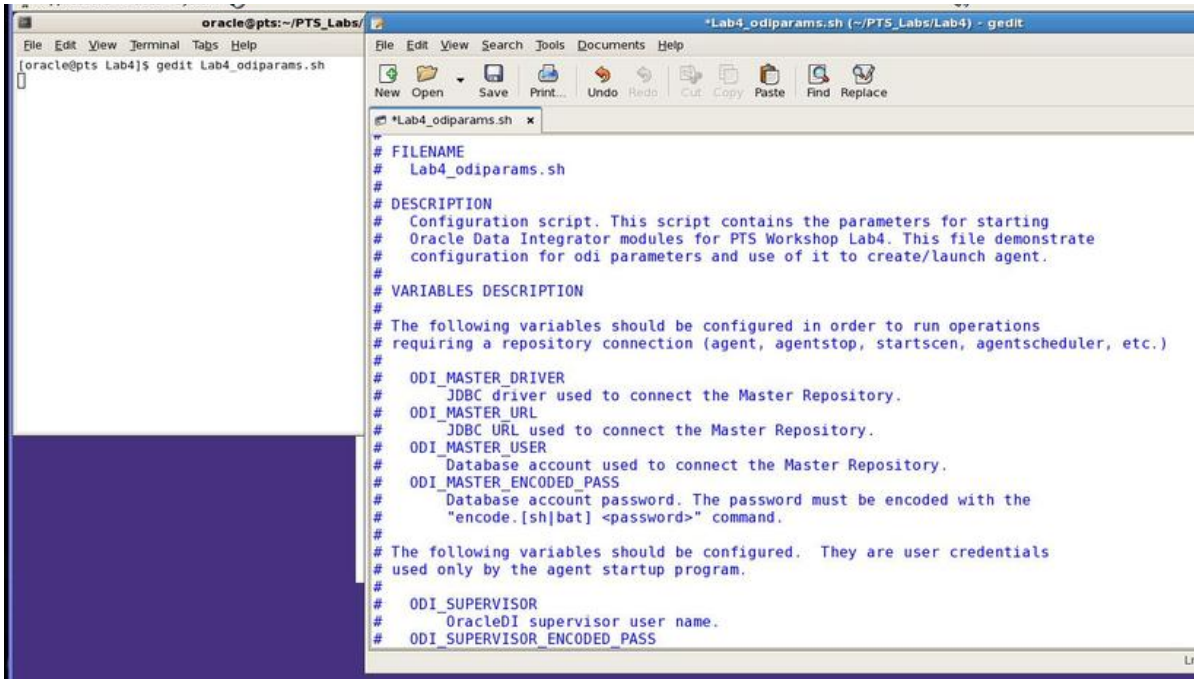
<table>
<tr><th>Step</th><th>Screen/Page Description</th><th>Choices or Values</th></tr>
<tr><td></td><td></td><td>table below, save the labodiparams.sh file, and then close it. The agent’s connectivity is now set up.

<table>
<tr><td>Parameter</td><td>Value</td></tr>
<tr><td>ODI_MASTER_DRIVER</td><td>oracle.jdbc.driver.OracleDriver</td></tr>
<tr><td>ODI_MASTER_URL</td><td>jdbc:oracle:thin:@pts.us.oracle.com:1521:XE</td></tr>
<tr><td>ODI_MASTER_USER</td><td>snpm1</td></tr>
<tr><td>ODI_MASTER_ENCODED_PASS</td><td>Insert your encoded password.</td></tr>
<tr><td>ODI_SECU_WORK_REP</td><td>WORKREP_PR2-1</td></tr>
<tr><td>ODI_SUPERVISOR_ENCODED_PASS</td><td>Insert your encoded password.</td></tr>
<tr><td>ODI_USER</td><td>Leave the default value.</td></tr>
<tr><td>ODI_ENCODED_PASS</td><td>Leave the default value.</td></tr>
<tr><td>ODI_JAVA_HOME</td><td>Leave the default value</td></tr>
</table>

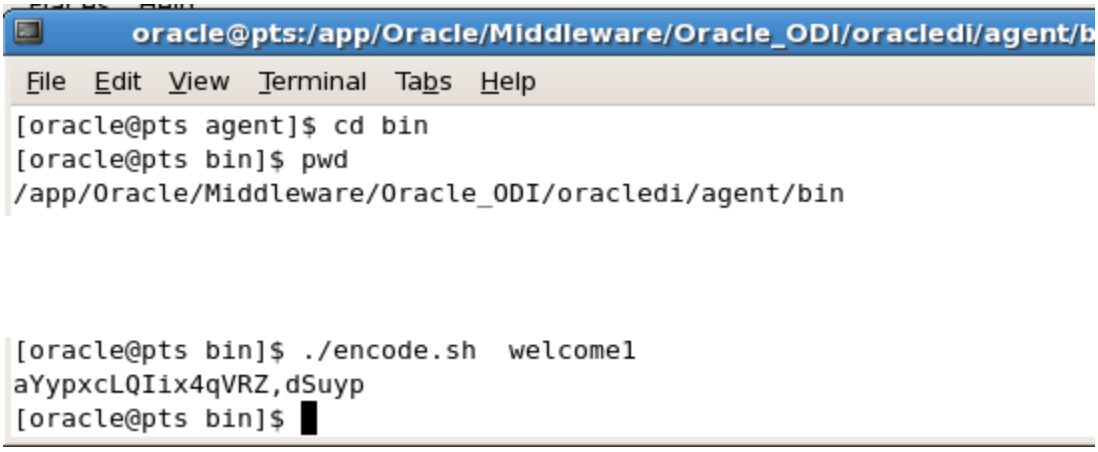
Note

▪ snpm1 is RDBMS schema/user (Oracle XE) for the Master repository. It was pre-created for this and subsequent practices.
▪ Work Repository name is WORKREP_PR2-1.
▪ Because each time when you encode the password, it gets different values, your encoded password will differ from the one provided in the screenshot.
▪ Do not change the default value of the ODI_USER and ODI_ENCODED_PASS parameters. Those parameters were pre-coded during ODI installation.</td></tr>
</table>

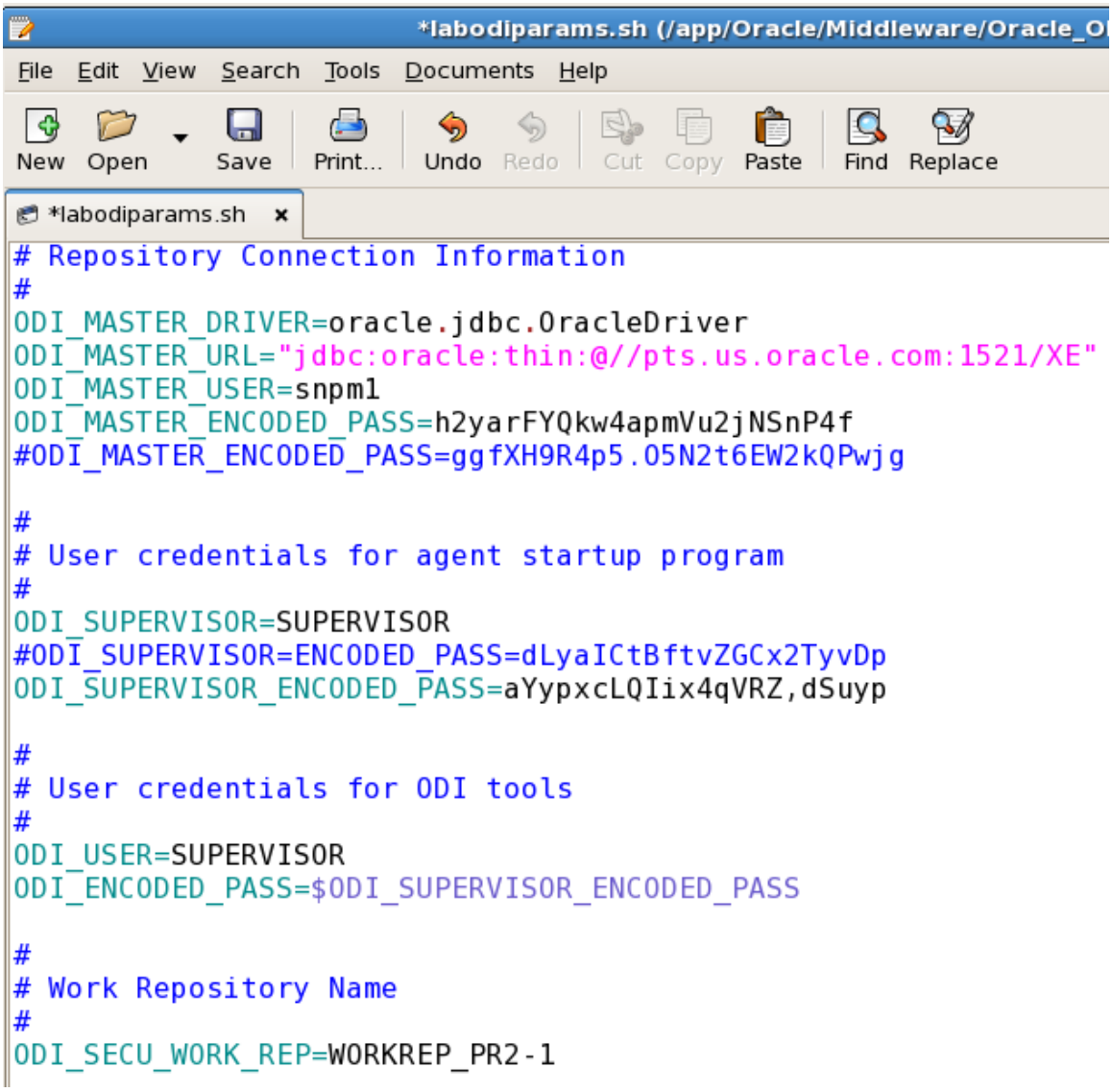
a) Open Lab4_odiparams.sh file and keep it open to update:



b) Encrypt the password from different terminal window and from within $ODI_HOME/bin directory



c) Update param files with encrypted password and other parameters as specified for the step



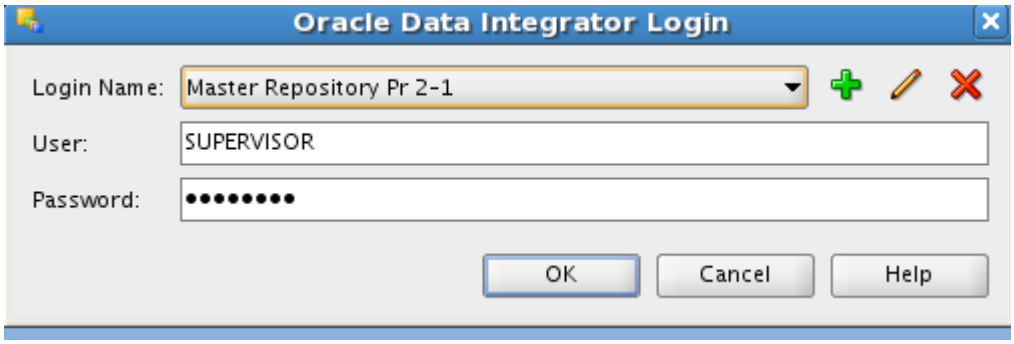
2) After the ODI Agent is installed, you need to set up ODI Agent with ODI Topology Navigator. To set up ODI Agent with Topology Navigator, perform the following steps:

Step	Screen/Page Description	Choices or Values
a.	ODI Login	If not started, start ODI Studio by selecting Applications >Accessories > Terminal> Type **odistudio**. Click ODI menu and select “Connect Master Repository Pr 2-1”, and then click “Connect To Repository”. Click OK.
b.	Topology navigator	Click Topology Navigator tab. In Topology Navigator, select the Physical Architecture panel. Right-click the

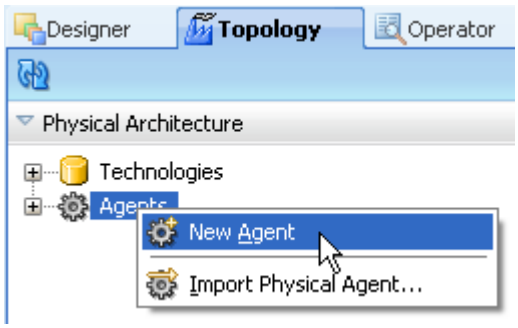
Step	Screen/Page Description	Choices or Values
		Agents node. Select New Agent.
c.	Agent: localagent	Fill in the following fields: Name: **localagent** Host: Network name or IP address of the machine the agent has been launched on. Verify that this parameter is set to localhost. Port: Listening port used by the agent. By default, this port is 20910. Leave the default value. Web Application Context: Name of the web application corresponding to the J2EE agent deployed on an application server. For standalone agents, this field should be set to oracledіagent. Set Maximum number of sessions supported by this agent to 250. Click Save button.
d.	Topology Navigator Local Agent: New	Now you have to insert a logical agent in Logical Architecture, and map it to the newly created Physical agent. Click the Logical Architecture tab. Right-click Agents and select New Logical Agent. On the screen that follows, set the Name to "**localagent**." Set Physical Agents to **localagent**. From file menu click Save, and then close the Logical Agent tab.

a)

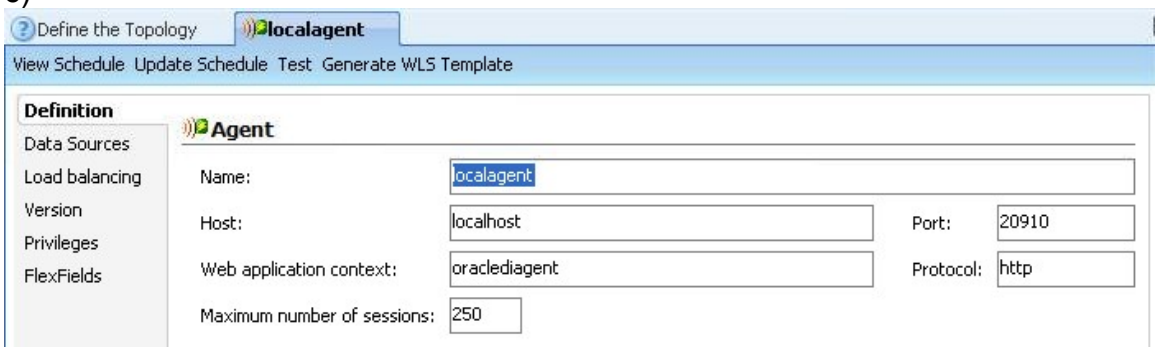

Designer
Topology
Operator
Connect To Repository...


Oracle Data Integrator Login
Login Name:
Master Repository Pr 2-1
User:
SUPERVISOR
Password:
OK
Cancel
Help

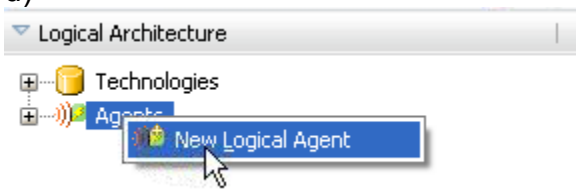
b)

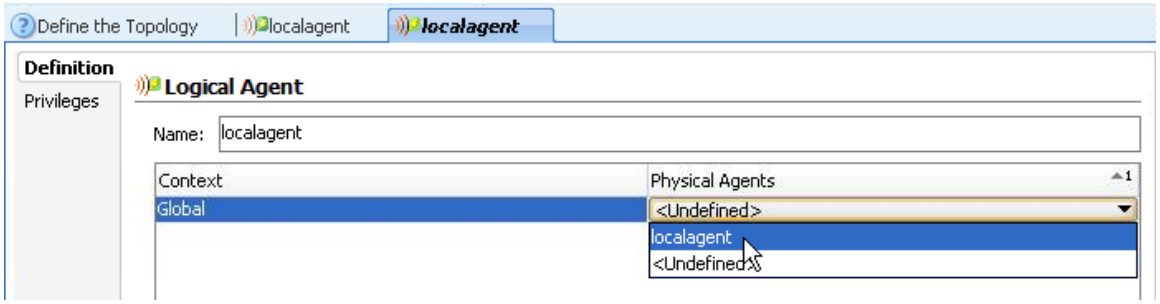

Designer
Topology
Operator
Physical Architecture
Technologies
Agents
New Agent
Import Physical Agent...

c)

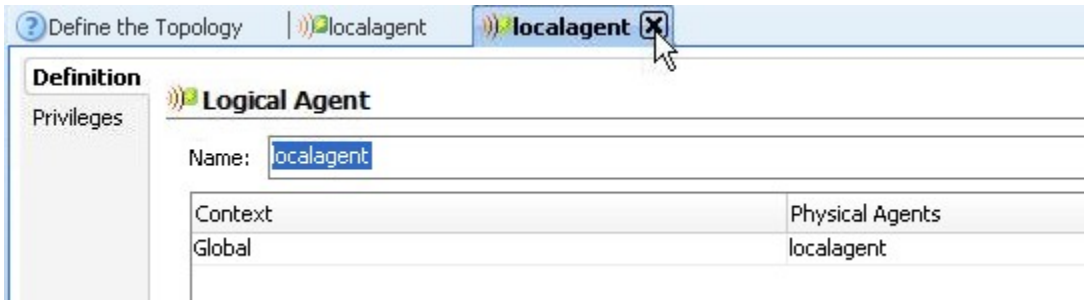

Define the Topology
localagent
View Schedule
Update Schedule
Test
Generate WLS Template
Definition
Data Sources
Load balancing
Version
Privileges
FlexFields
Agent
Name:
localagent
Host:
localhost
Port:
20910
Web application context:
oraclediagent
Protocol:
http
Maximum number of sessions:
250

d)


Logical Architecture
Technologies
Agents
New Logical Agent


Define the Topology
localagent
localagent
Definition
Privileges
Logical Agent
Name: localagent
Context
Physical Agents
Global
<Undefined>
localagent
<Undefined>

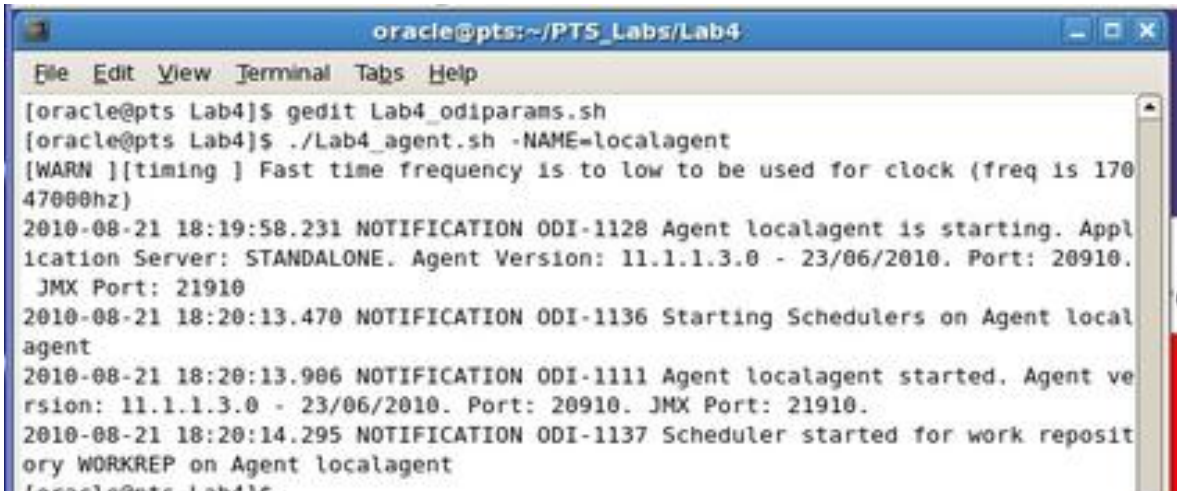

File Edit View Search ODI Tools Window Help
New... Ctrl-N
Close Ctrl-F4
Close All Ctrl+Shift-F4
Save Ctrl-S
Save All
Rename...
Compare With
Page Setup...
Topology
Define the Topology
localagent
localagent
Definition
Privileges
Logical Agent
Name: localagent
Context
Physical Agents
Global
localagent


Define the Topology
localagent
localagent
Definition
Privileges
Logical Agent
Name: localagent
Context
Physical Agents
Global
localagent

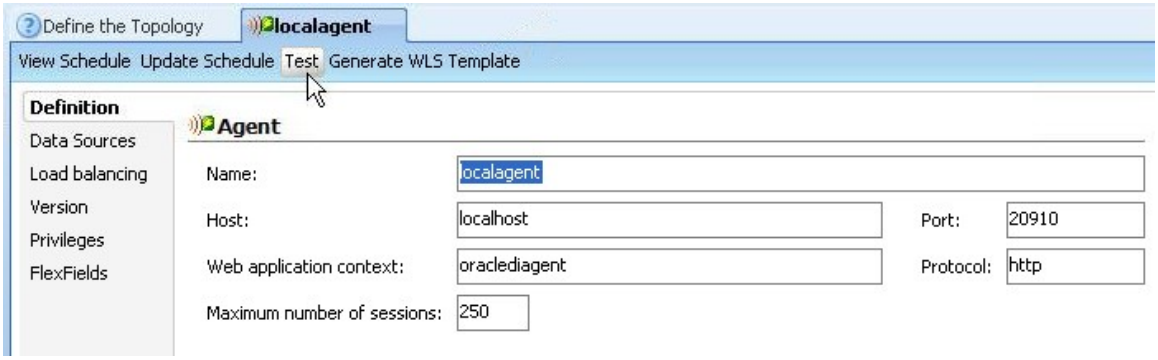
3) Now that ODI Agent is set up, it can be executed directly from the command line.

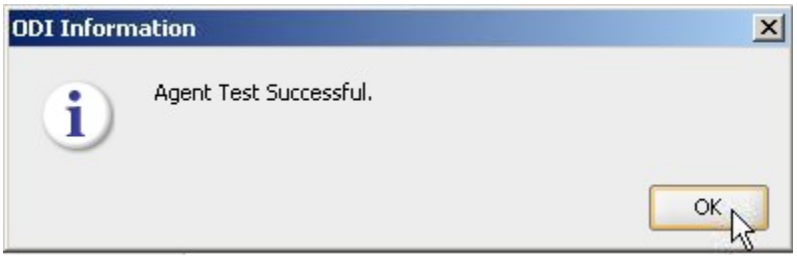
Step	Screen/Page Description	Choices or Values
a.	Command Prompt	Switch back to the terminal shell you left open at the Lab4 directory **/home/oracle/PTS_Labs/Lab4**. Execute the **Lab4_agent.sh** file using the following command: **./Lab4_agent.sh -NAME=localagent**
b.	Services	The agent is now starting. Verify that ODI Agent is successfully started. Minimize the window **Command Prompt – Lab4_agent.sh-NAME=localagent**.
c.	Oracle Data Integrator	In ODI, click Test icon to verify connection of the agent **localagent**. @ Close **localagent** tab.

a & b)



c)


Define the Topology
localagent
View Schedule
Update Schedule
Test
Generate WLS Template
Definition
Data Sources
Load balancing
Version
Privileges
FlexFields
Agent
Name:
localagent
Host:
localhost
Port:
20910
Web application context:
oracledіagent
Protocol:
http
Maximum number of sessions:
250


ODI Information
Agent Test Successful.
OK

Lab 5: Creating Models

Introduction

A Model is the description of a set of datastores. It corresponds to a group of tabular data structures stored in a data server. A model is based on a Logical Schema defined in the topology. In a given Context, this Logical Schema is mapped to a Physical Schema. The Data Schema of this Physical Schema contains physical data structure: tables, files, JMS messages, elements from an XML file, that are represented as datastores.

Models can be organized into model folders and the datastores of a model can be organized into sub-models.

A new model is created with no datastores. Reverse-engineering is the process that populates the model in Oracle Data Integrator by retrieving metadata from the data server containing the data structures. There are two different types of reverse-engineering:

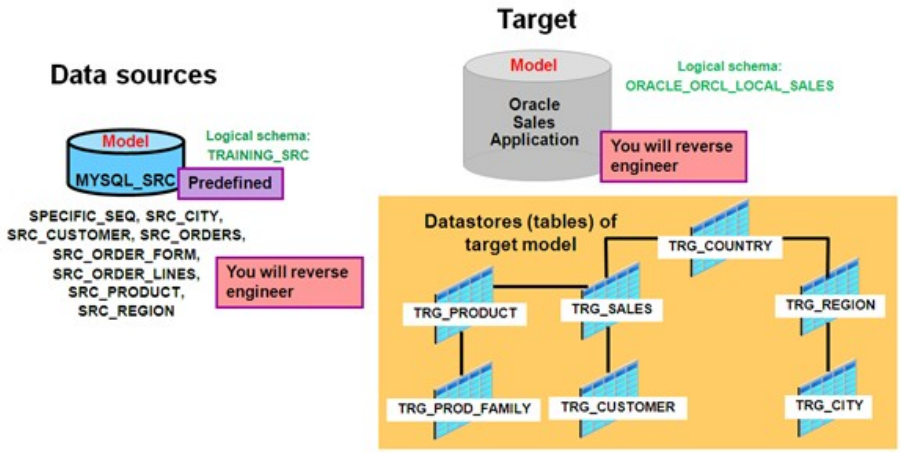
- **Standard reverse-engineering** uses standard JDBC driver features to retrieve the metadata.
- **Customized reverse-engineering** uses a technology-specific Reverse Knowledge Module (RKM) to retrieve the metadata, using a method specific to the given technology. This method usually retrieves more information than the Standard reverse-engineering method.

Prerequisites

Completion **Lab 4-2: Creating and Managing Topology**.

Process Overview

In the previous practice, you configured the schemas containing the application data stored in the Oracle database. You now create the models corresponding to this data and reverse engineer the schemas' data structures.



Steps to create a model by reverse engineering:

1. Create an empty model.
2. Set up the reverse engineering strategy.
   - Standard versus customized reverse engineering
3. Run the reverse engineering process.
   - Use the selective reverse option (standard reverse engineering).
4. Flesh out the model.
   - Add data stores, columns, constraints, and so on.

Scenario

Now that you have your ODI environment set up, you can create new ODI Models and reverse engineer all tables in the models.

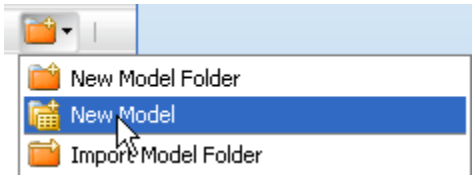
Instructions

1) Connect to Work Repository **WORKREP_PR4** from ODI Studio with user **SUPERVISOR** and password **welcome1**.

2) Create a model for the Oracle schema.

   a) In Designer, select the Models tab.

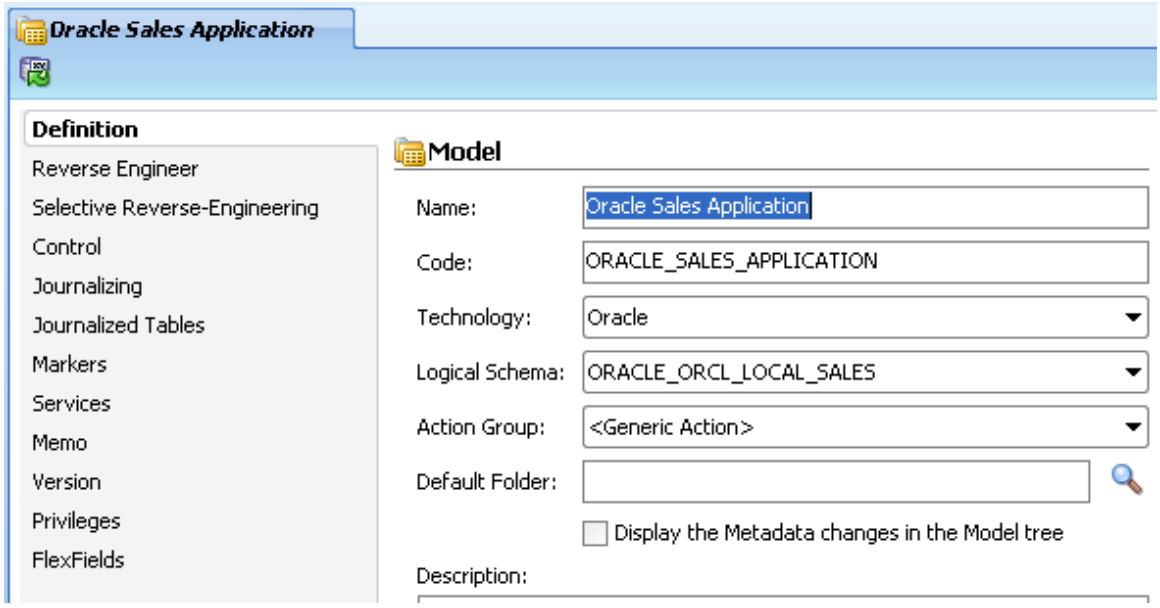
b) Click the New Model icon and then select New Model.



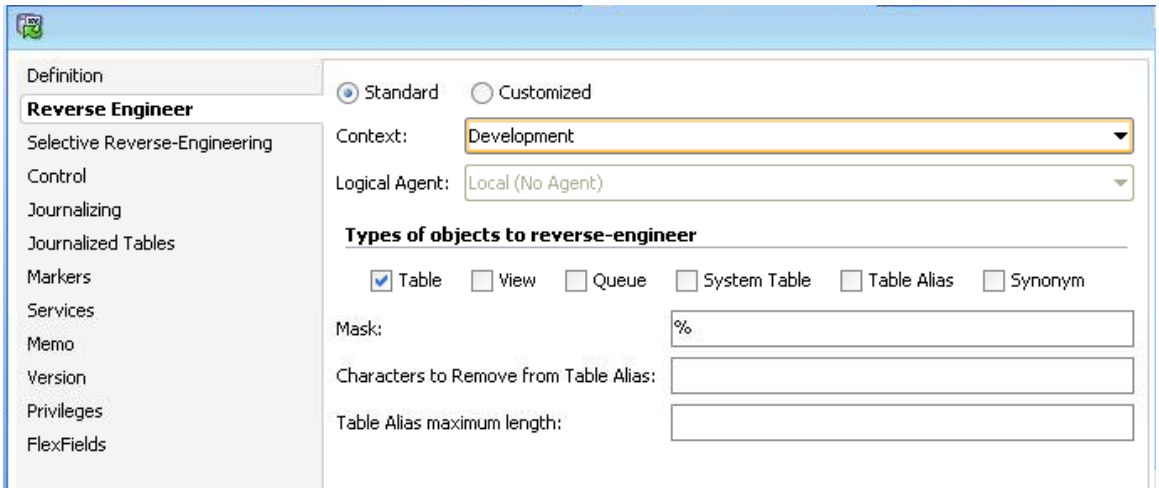
c) Specify (enter or select) the following parameters on the Definition tab:

- **Name:** Oracle Sales Application
- **Code:** ORACLE_SALES_APPLICATION
- **Technology:** Oracle
- **Logical Schema:** ORACLE_ORCL_LOCAL_SALES

The Definition tab should appear as below:

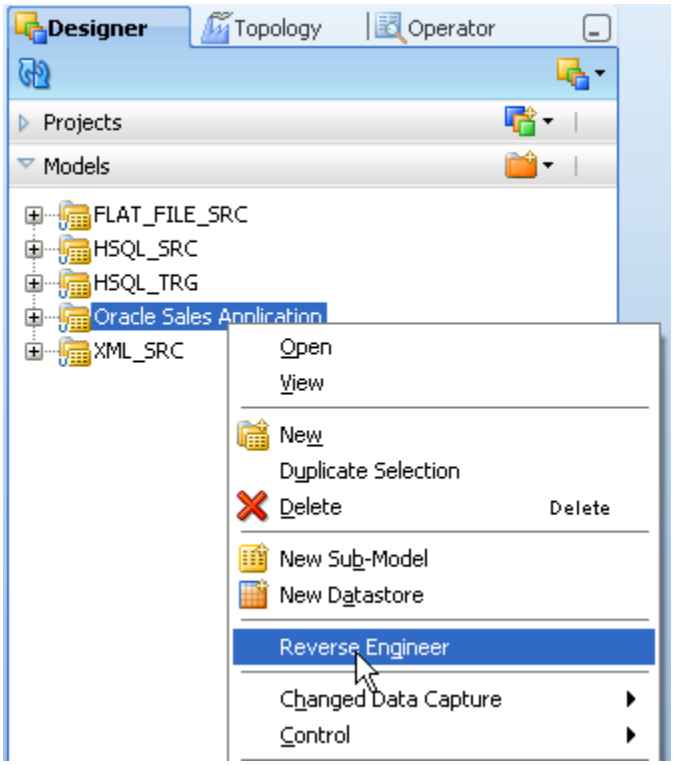


d) Click the Reverse Engineer tab, and then select Development from the Context drop-down list. Click Save button.

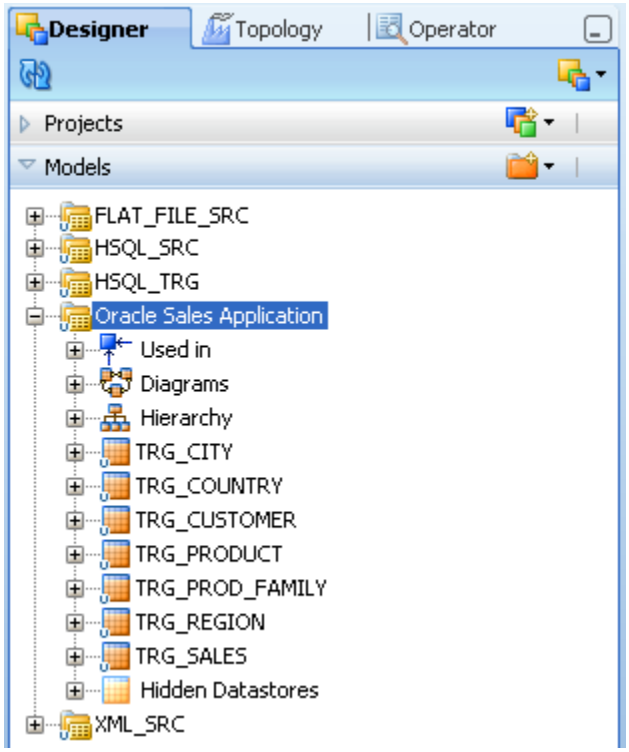


3) Reverse engineer all the tables in this model.

a) Right-click Oracle Sales Application model and select the Reverse Engineer option. If the Confirmation window appears, click Yes.
Note: The progress of the reverse engineering process is shown on the status bar.



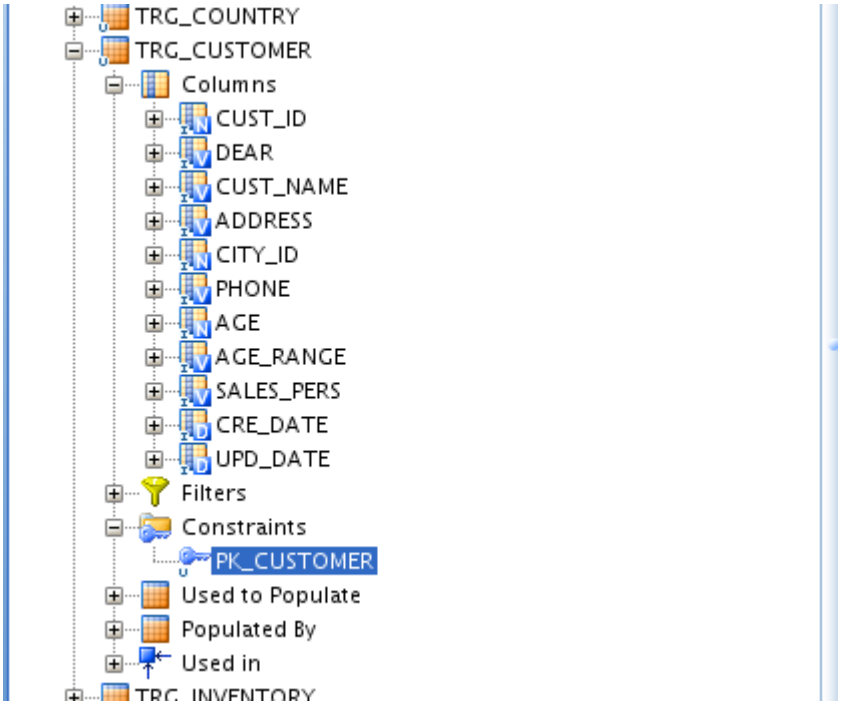
b) Verify the model reverse engineered successfully. In the tree view, expand the Oracle Sales Application model. The *datastore*s of the model appear.



4) Check that the columns and constraints that were reverse engineered for the TRG_CUSTOMER table correspond to its data definition language (DDL) given below:

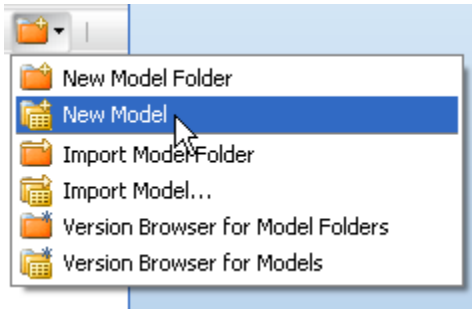
```
create table TRG_CUSTOMER (
        CUST_ID             NUMERIC(10) not null,
        DEAR                VARCHAR(4),
        CUST_NAME           VARCHAR(50),
        ADDRESS             VARCHAR(100),
        CITY_ID             NUMERIC(10) not null,
        PHONE               VARCHAR(50),
        AGE                 NUMERIC(3),
        AGE_RANGE           VARCHAR(50),
        SALES_PERS          VARCHAR(50),
        CRE_DATE            DATE,
        UPD_DATE            DATE,
        constraint PK_TRG_CUSTOMER primary key (CUST_ID));
```

a) Expand the TRG_CUSTOMER *datastore*, and then expand the Columns and Constraints nodes. The list of columns and constraints that were reverse engineered for this table appear in the tree view. Close the tabs.



5) Create a model for MYSQL Schema.

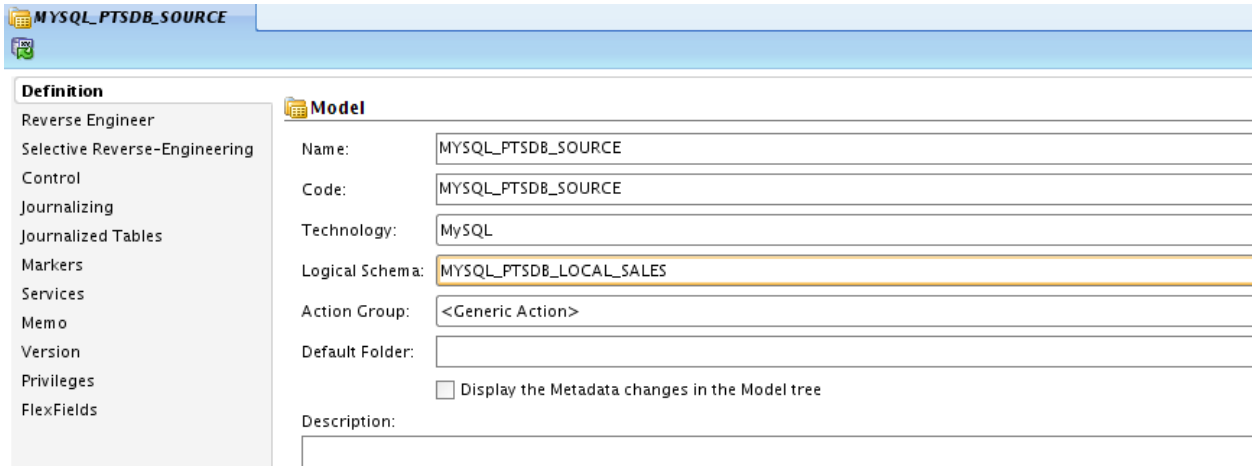
a) Click the New Model icon and then select New Model.



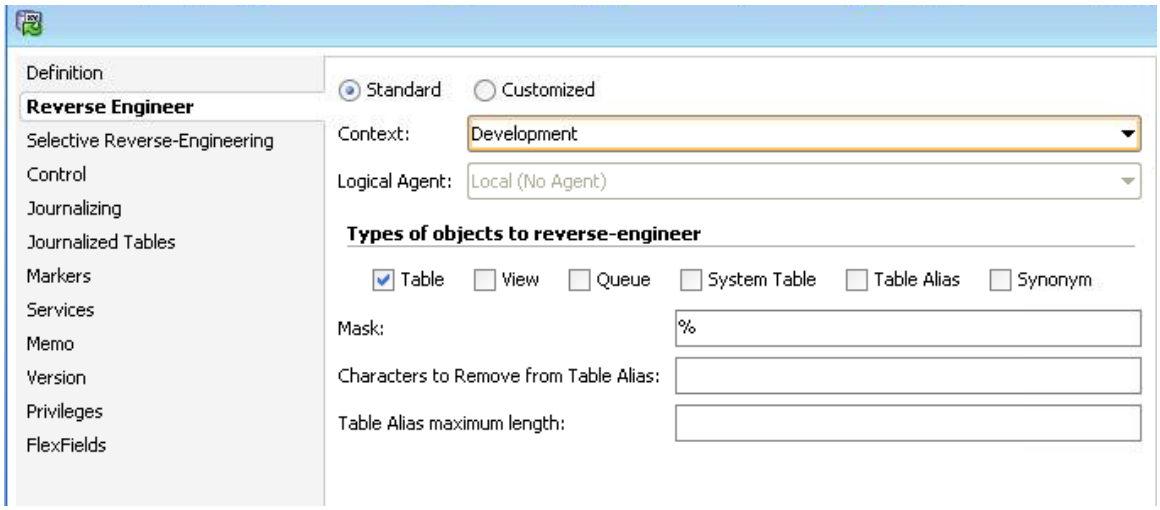
b) Specify (enter or select) the following parameters on the Definition tab:

- **Name:** MYSQL_PTSDB_SOURCE
- **Code:** MYSQL_PTSDB_SOURCE
- **Technology:**MYSQL
- **Logical Schema:** MYSQL_PTSDB_LOCAL_SALES

c) The Definition tab should appear as below.

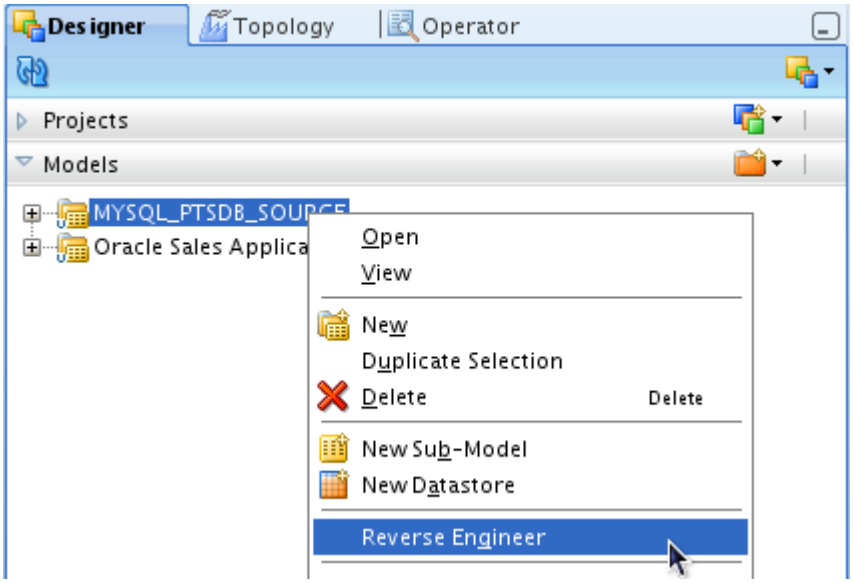


d) Click the Reverse Engineer tab. Select Development from the Context drop-down list. Click the Save button.

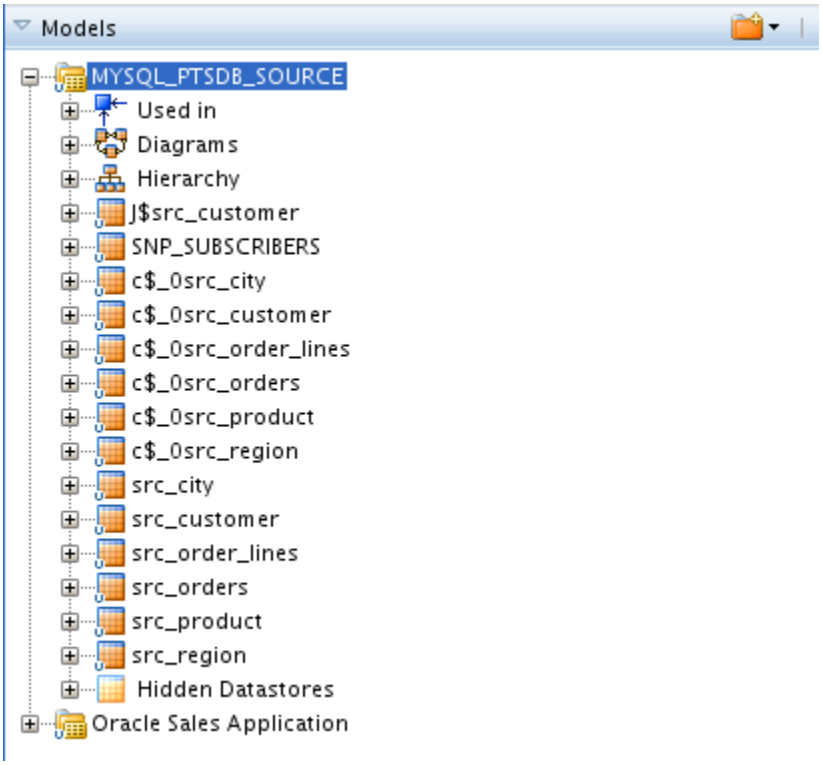


6) Reverse engineer all the tables in this model.

a) In the Models tree view, right-click MYSQLDB_PTSDB_SOURCE model and select the Reverse Engineer option.
Note: The progress of the reverse engineering process is shown on the status bar.



b) Verify the model reverse engineered successfully. In the tree view, expand the Geographic Information model. The *datastore*s of the model appear.



Lab 6: Creating Project and Folders

Introduction

An integration project is composed of several components:

- **Folders** – components that help organize the work into a project:
  - **Packages** – workflow, made up of a sequence of steps organized into an execution diagram
  - **Interfaces** – reusable dataflow comprised of a set of declarative rules that describe the loading of a datastore or a temporary target structure from one or more source datastores
  - **Procedures** – reusable component that groups a sequence of operations
- **Variables, sequences, user functions**
- **Knowledge Modules** – code template related to a given technology that provides a specific function (loading data, reverse-engineering, journalizing)
- **Markers** - tags attached to any ODI object to help organize a project

Process Overview

Guidelines in creating a new project:

- Set up a new project
- Use folders to organize your work
- Import the right knowledge modules
- Import and export objects
- Use markers to manage the project

It is recommended to maintain a good organization of the project by using folders. Folders simplify finding objects developed in the project and facilitate the maintenance tasks.

Scenario

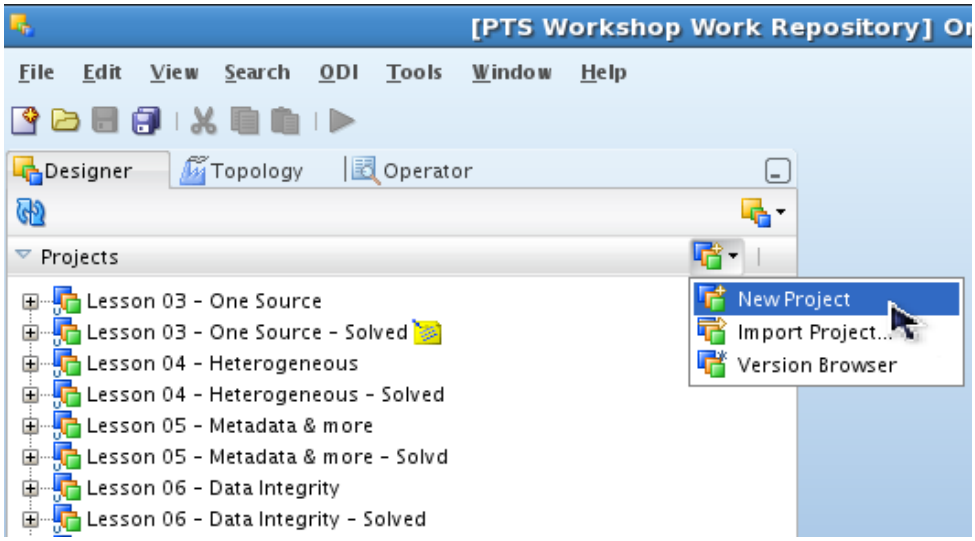
You are responsible for data loading, transformation, and validation. To start an integration project, you need to create a new ODI project and import Knowledge Modules that will be used for development of your integration project.

Instructions

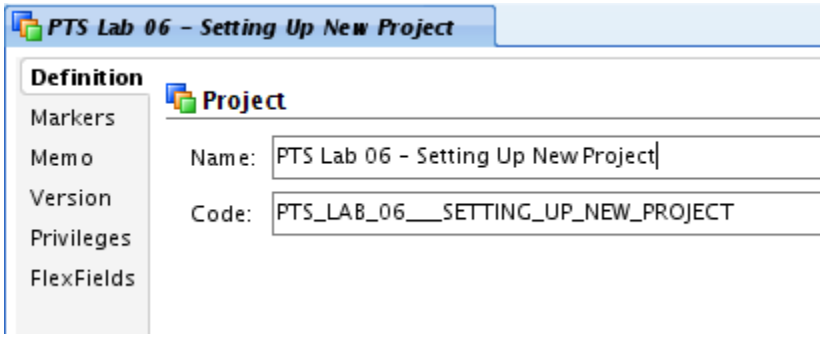
1) If necessary, connect to Work Repository user **PTS Training Work Repository** from ODI Studio with user **SUPERVISOR** and password **SUPERVISOR**. Create New Project.

   Create a project **PTS Lab 06 – Setting Up New Project** with a folder called **HandsOn**.

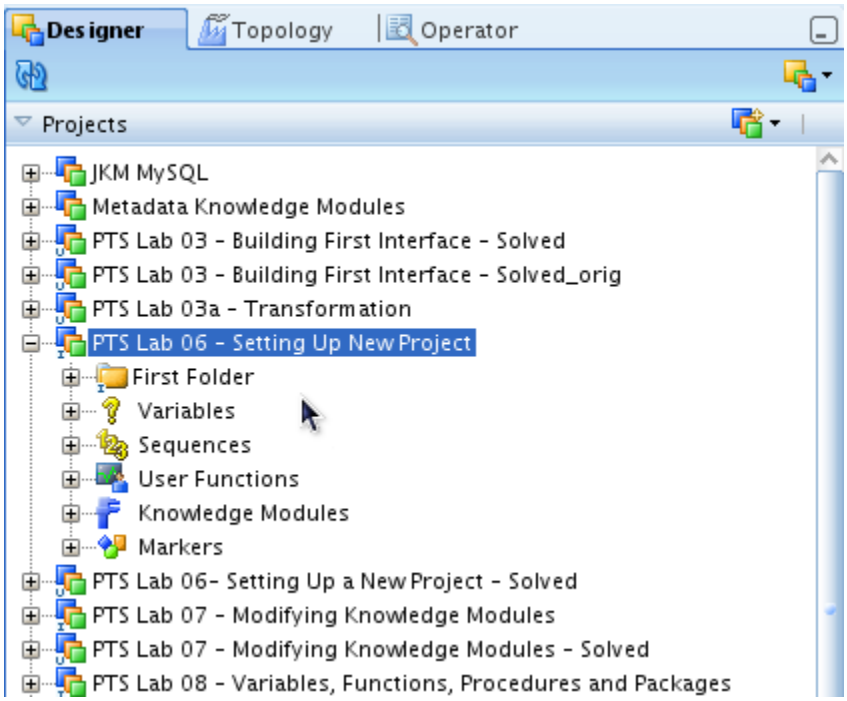
   a) Switch to the Designer Navigator. Click the **Designer** tab. Select **Projects** tab, click the **New Project** icon, and then select **New Project**.



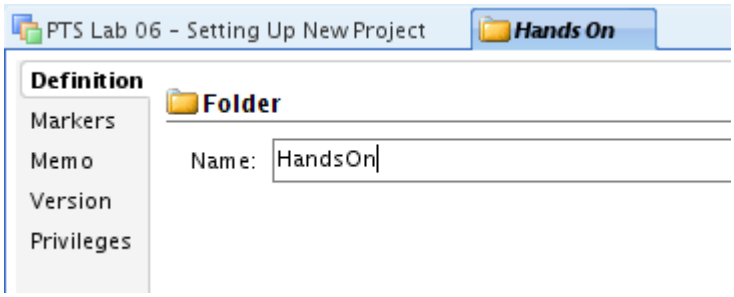
   Enter the name of the project: **PTS Lab 06 – Setting Up New Project**. The code is automatically generated. Note: If the maximum of 35 characters is reached, this will result in a blank code. In such cases, you may need to manually enter a value for the code.

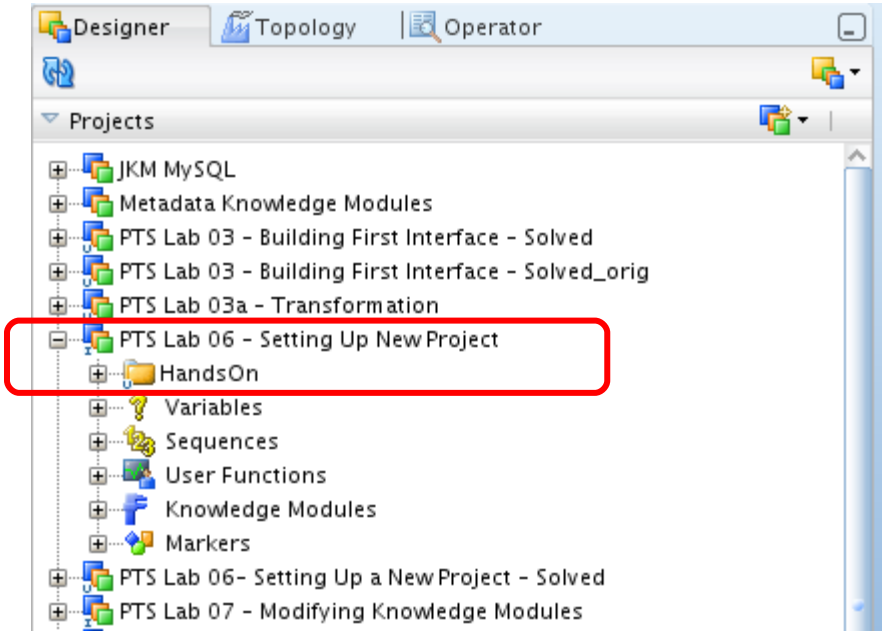


b) Click the **Save** button to create the project. The project appears in the tree view. Expand the **PTS Lab 06 – Setting Up New Project** project node.



c) ODI creates a folder called **FirstFolder**. Double-click this folder. In the editing window that appears, edit the folder Name: **HandsOn**. Click **Save** button.



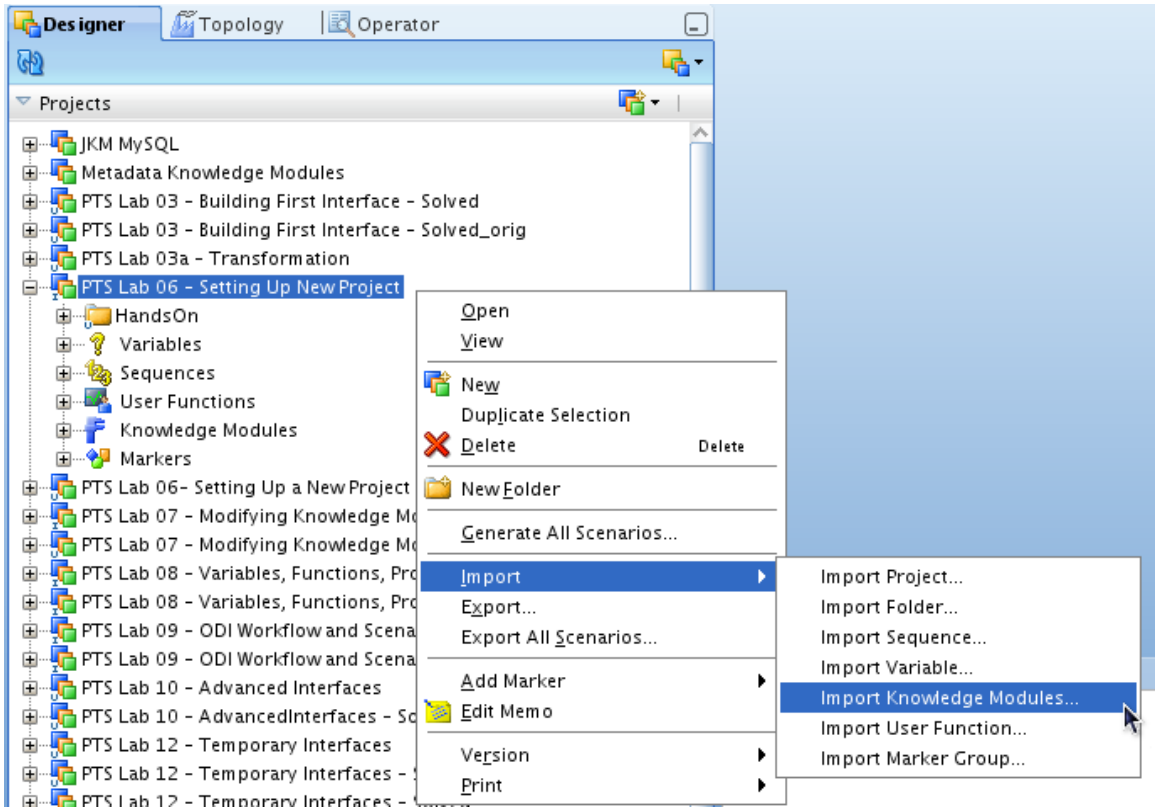


2) Import Knowledge Modules

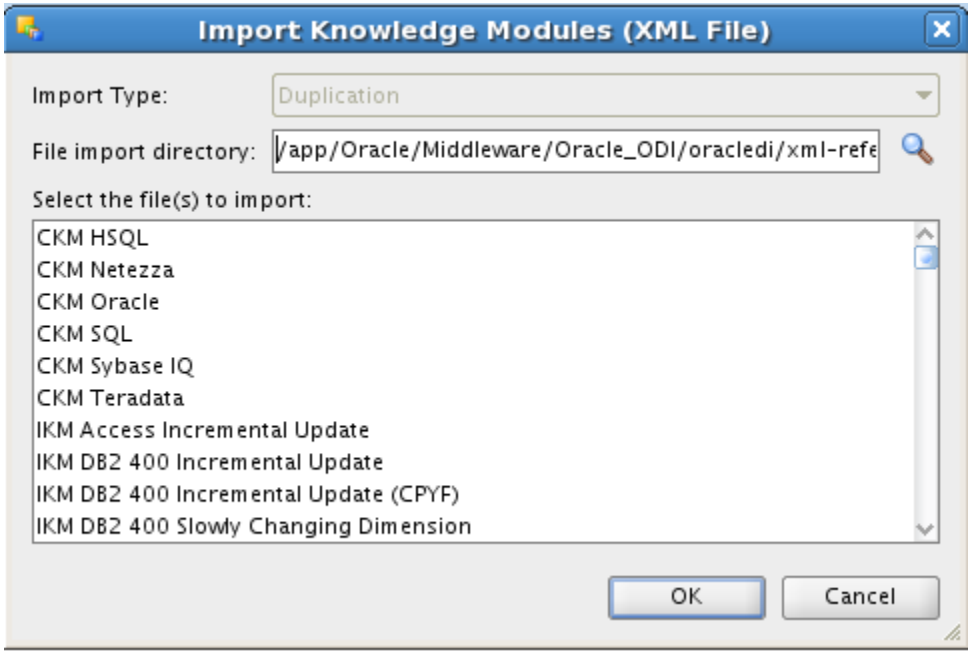
Import the knowledge modules required for working with the following technologies:

- Sources:
  - MySQL
  - File
- Targets
  - Oracle

a) Select the **PTS Lab 06 – Setting Up New Project** project node. Right-click and then select **Import > Import Knowledge Modules**.



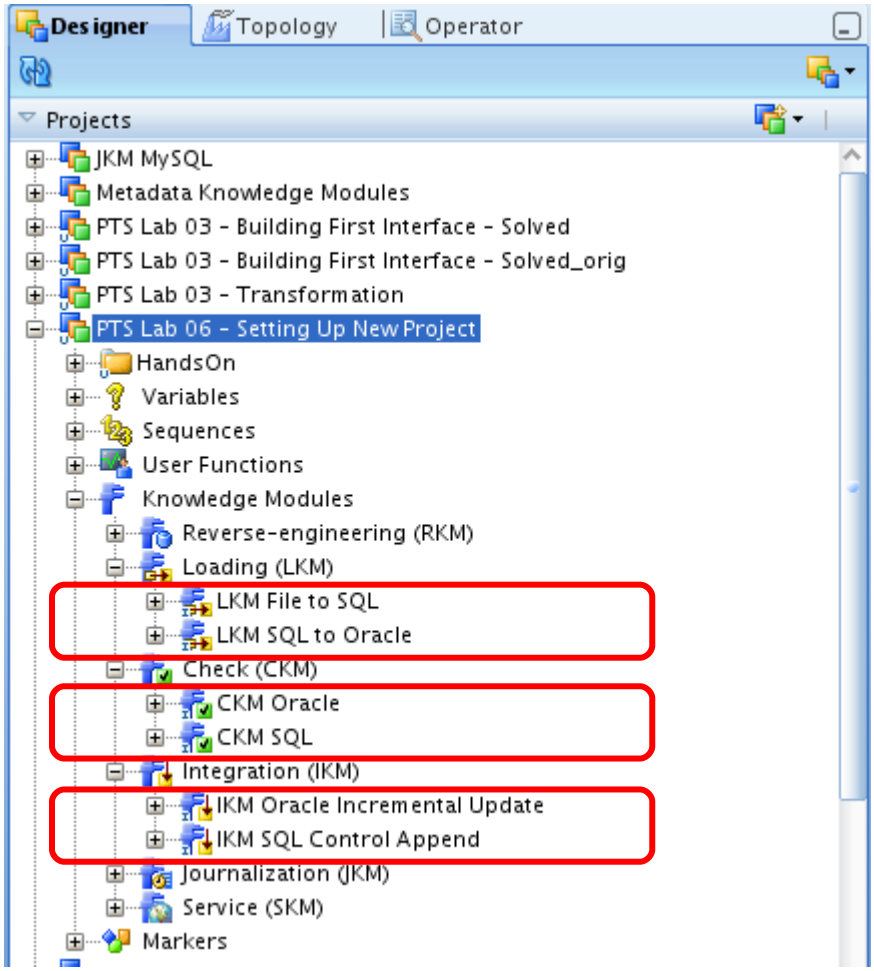
b) The Import Knowledge Modules window appears.
If no Knowledge Modules appear, type or navigate to the following directory: /app/Oracle/Middleware/Oracel_ODI/oracledi/xml-reference



c) Select the following knowledge modules. Use the Ctrl key for multiple selections. Click **OK**. In the **Import Report**, click **Close**.

- CKM SQL
- CKM Oracle
- IKM Oracle Incremental Update
- IKM SQL Control Append
- LKM File to SQL
- LKM SQL to Oracle

d) Check the imported knowledge modules by expanding corresponding nodes **PTS Lab 06 – Setting Up New Project > Knowledge Modules** as shown below:



Lab 7: Customizing Knowledge Modules

Introduction

Knowledge Modules (KMs) are components of Oracle Data Integrator's Open Connector technology. KMs contain the knowledge required by Oracle Data Integrator to perform a specific set of tasks against a specific technology or set of technologies.

Oracle Data Integrator uses six different types of Knowledge Modules:

- **RKM (Reverse Knowledge Modules)** are used to perform a customized reverse-engineering of data models for a specific technology. These KMs are used in data models.
- **LKM (Loading Knowledge Modules)** are used to extract data from source systems (files, middleware, database, etc.). These KMs are used in interfaces.
- **JKM (Journalizing Knowledge Modules**) are used to create a journal of data modifications (insert, update and delete) of the source databases to keep track of the changes. These KMs are used in data models and used for Changed Data Capture.
- **IKM (Integration Knowledge Modules)** are used to integrate (load) data to the target tables. These KMs are used in interfaces.
- **CKM (Check Knowledge Modules)** are used to check that constraints on the sources and targets are not violated. These KMs are used in data model's static check and interfaces flow checks.
- **SKM (Service Knowledge Modules)** are used to generate the code required for creating data services. These KMs are used in data models.

Process Overview

Guidelines for developing your own Knowledge Modules:

- Very few KMs are ever created. They usually are extensions or modifications of existing KMs.
- Duplicate existing steps and modify them. This prevents typos in the syntax of the odiRef methods.

- All interfaces using the KM inherit the new behavior. Remember to make a copy of the KM if you do not want to alter existing interfaces. Modify the copy, not the original.

Scenario

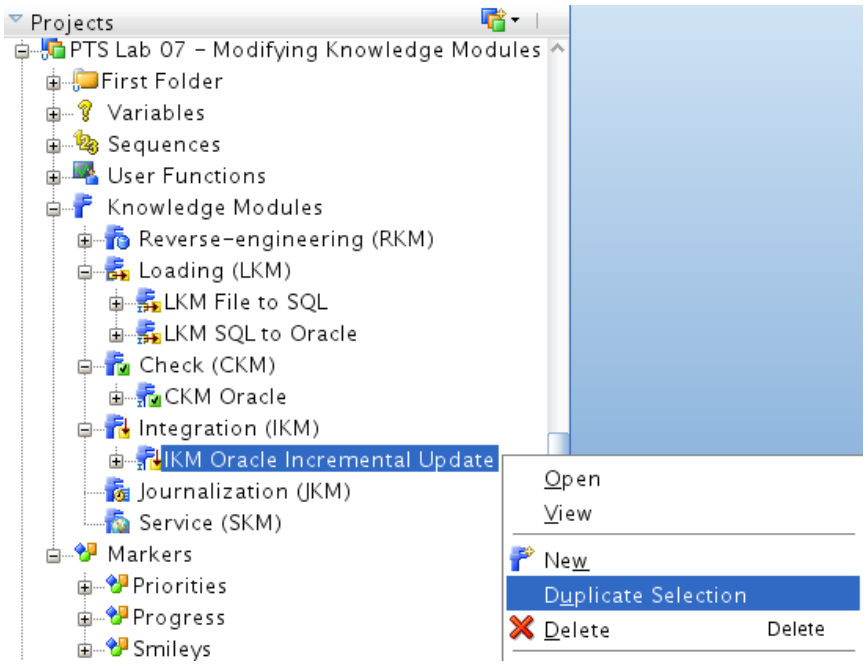
We will now modify an existing Knowledge Module to see how efficient this modification can be. We will modify a Knowledge Module that is already in use and propagate our changes to the interfaces using this Knowledge Module.

We will add auditing capability to our interface, by modifying the KM. This is typical of what would be done by a customer who wants to add SOX-type capabilities to an existing deployment.

Lab 7.1: Modify Knowledge Module

Instructions

1) In the project ***PTS Lab 07 - Modifying Knowledge Modules***, right-click on the IKM Oracle Incremental Update Knowledge Module, and select Duplicate Selection.

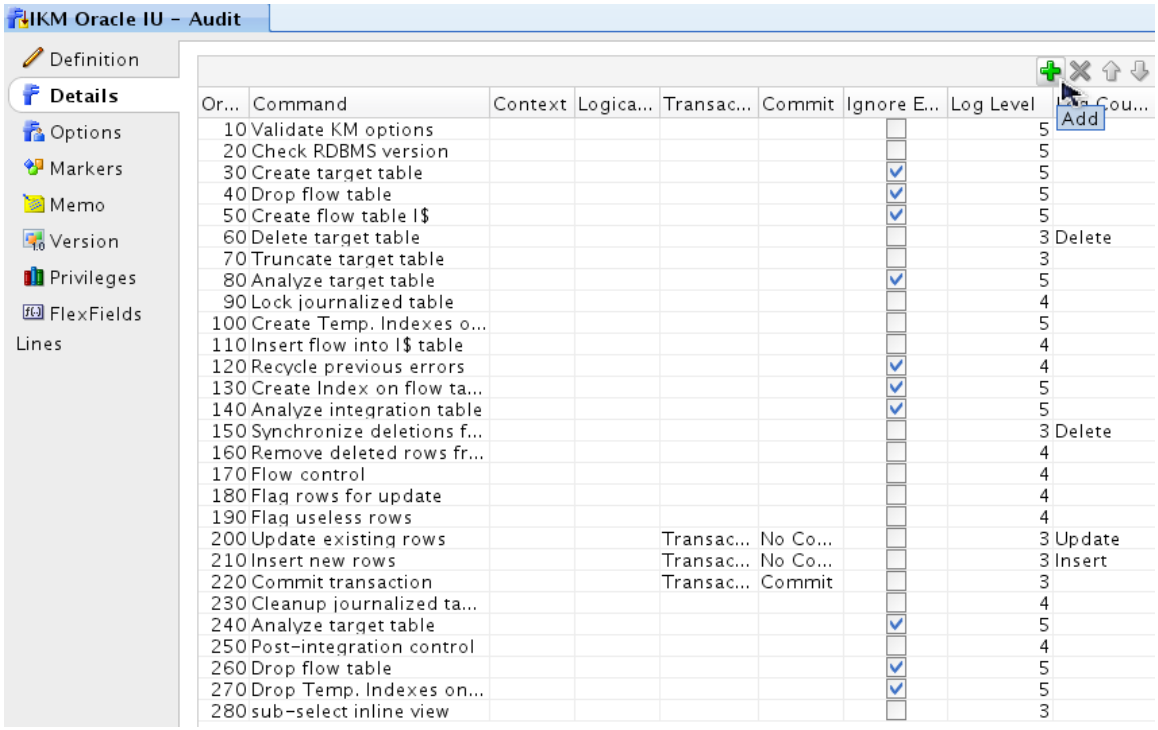


2) Open the copy and rename it to *IKM Oracle IU – Audit.*

The objective here is to add two steps that will:

- create an audit table (and only generate a warning if the table already exists). Name the table after the target table, simply add _H at the end of the table name. (for instance, *CUSTOMER_H*)
- in the audit table, insert three columns, the primary key of the record being processed by the interface, a time stamp, and an indicator that will tell us what operation was done on the record ('I' = Insert, 'D' = Delete, 'U' = Update).

3) In the Details tab, add a step

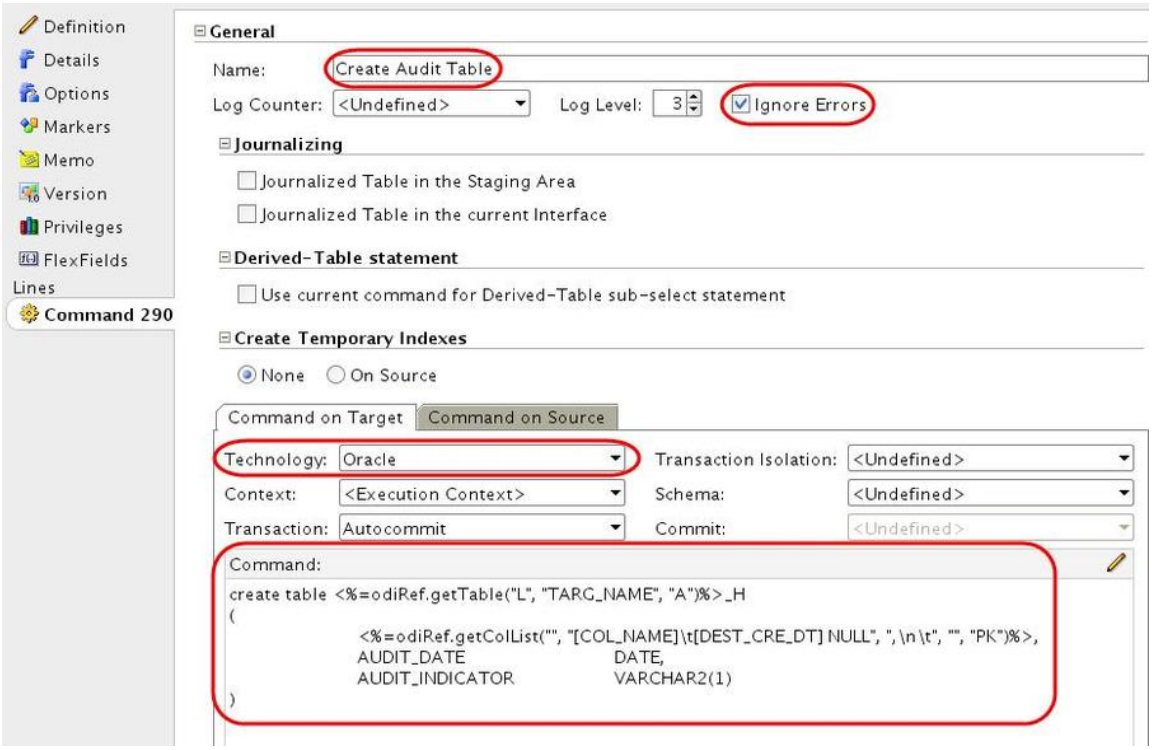


Or...	Command	Context	Logica...	Transac...	Commit	Ignore E...	Log Level	Cou...
10	Validate KM options					☐	5	
20	Check RDBMS version					☐	5	
30	Create target table					☑	5	
40	Drop flow table					☑	5	
50	Create flow table I$					☑	5	
60	Delete target table					☐	3	Delete
70	Truncate target table					☐	3	
80	Analyze target table					☑	5	
90	Lock journalized table					☐	4	
100	Create Temp. Indexes o...					☐	5	
110	Insert flow into I$ table					☐	4	
120	Recycle previous errors					☑	4	
130	Create Index on flow ta...					☑	5	
140	Analyze integration table					☑	5	
150	Synchronize deletions f...					☐	3	Delete
160	Remove deleted rows fr...					☐	4	
170	Flow control					☐	4	
180	Flag rows for update					☐	4	
190	Flag useless rows					☐	4	
200	Update existing rows			Transac...	No Co...	☐	3	Update
210	Insert new rows			Transac...	No Co...	☐	3	Insert
220	Commit transaction			Transac...	Commit	☐	3	
230	Cleanup journalized ta...					☐	4	
240	Analyze target table					☑	5	
250	Post-integration control					☐	4	
260	Drop flow table					☑	5	
270	Drop Temp. Indexes on...					☑	5	
280	sub-select inline view					☐	3	

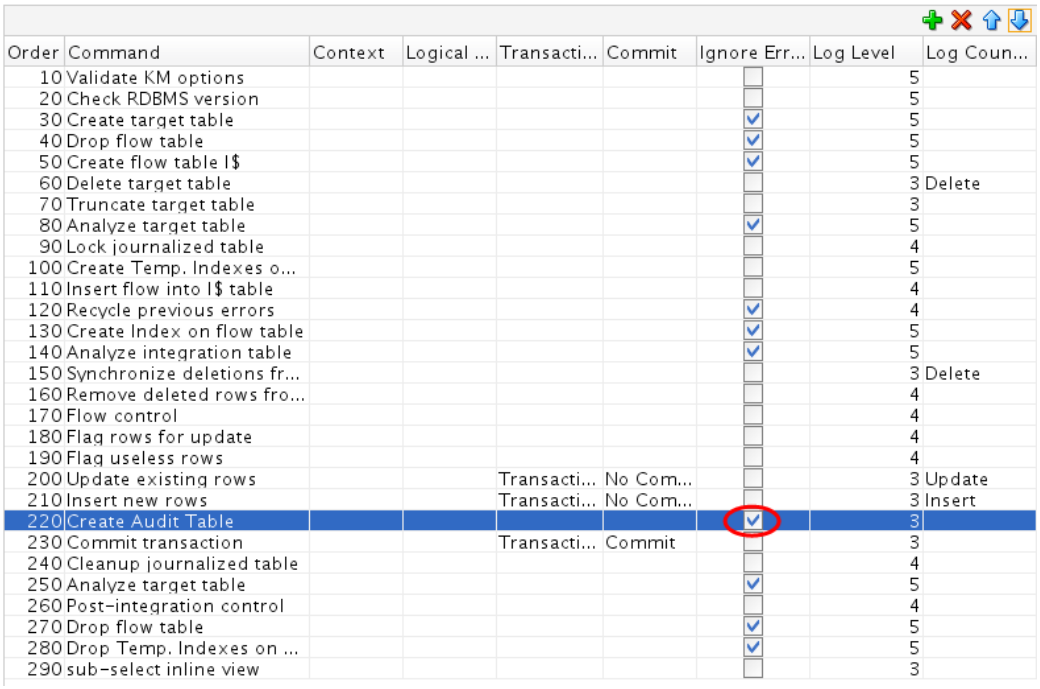
4) In the new Command window, name this command *Create Audit Table***.** Select the *Ignore Errors* check box. Set the Technology on Target to *Oracle*. Enter the following command to create the audit table. Verify that check boxes in *Journalizing* sections are not selected. If necessary deselect them.

Note: To reduce typing, you can copy the code from a similar step and modify as needed.

```
create table <%=odiRef.getTable("L", "TARG_NAME", "A")%>_H
(
    <%=odiRef.getColList("", "[COL_NAME]\t[DEST_CRE_DT]NULL",
",\n\t", "", "PK")%>,
        AUDIT_DATE              DATE,
        AUDIT_INDICATOR         VARCHAR2(1)
)
```



5) Click **Details** tab. Scroll down and select the *Create Audit Table* command at the bottom. Click the  icon several times to move the command up and place it right after the *Insert new rows* step. Verify that the Ignore Errors checkbox is selected.



Order	Command	Context	Logical ...	Transacti...	Commit	Ignore Err...	Log Level	Log Coun...
10	Validate KM options					☐	5	
20	Check RDBMS version					☐	5	
30	Create target table					☑	5	
40	Drop flow table					☑	5	
50	Create flow table I$					☑	5	
60	Delete target table					☐	3	Delete
70	Truncate target table					☐	3	
80	Analyze target table					☑	5	
90	Lock journalized table					☐	4	
100	Create Temp. Indexes o...					☐	5	
110	Insert flow into I$ table					☐	4	
120	Recycle previous errors					☑	4	
130	Create Index on flow table					☑	5	
140	Analyze integration table					☑	5	
150	Synchronize deletions fr...					☐	3	Delete
160	Remove deleted rows fro...					☐	4	
170	Flow control					☐	4	
180	Flag rows for update					☐	4	
190	Flag useless rows					☐	4	
200	Update existing rows			Transacti...	No Com...	☐	3	Update
210	Insert new rows			Transacti...	No Com...	☐	3	Insert
220	Create Audit Table					☑	3	
230	Commit transaction			Transacti...	Commit	☐	3	
240	Cleanup journalized table					☐	4	
250	Analyze target table					☑	5	
260	Post-integration control					☐	4	
270	Drop flow table					☑	5	
280	Drop Temp. Indexes on ...					☑	5	
290	sub-select inline view					☐	3	

6) Similarly, create a step that inserts the records into the audit table, call it *Insert Audit Records*. Select *the Ignore Errors* check box. Set the Technology on Target to *Oracle*. Enter the following command to insert the records.

```
Insert into <%=odiRef.getTable("L", "TARG_NAME", "A")%>_H
        (
   <%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "", "PK")%>,
        AUDIT_DATE,
        AUDIT_INDICATOR
        )
select <%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "", "PK")%>,
        sysdate,
        IND_UPDATE
from    <%=odiRef.getTable("L","INT_NAME","W")%>
```

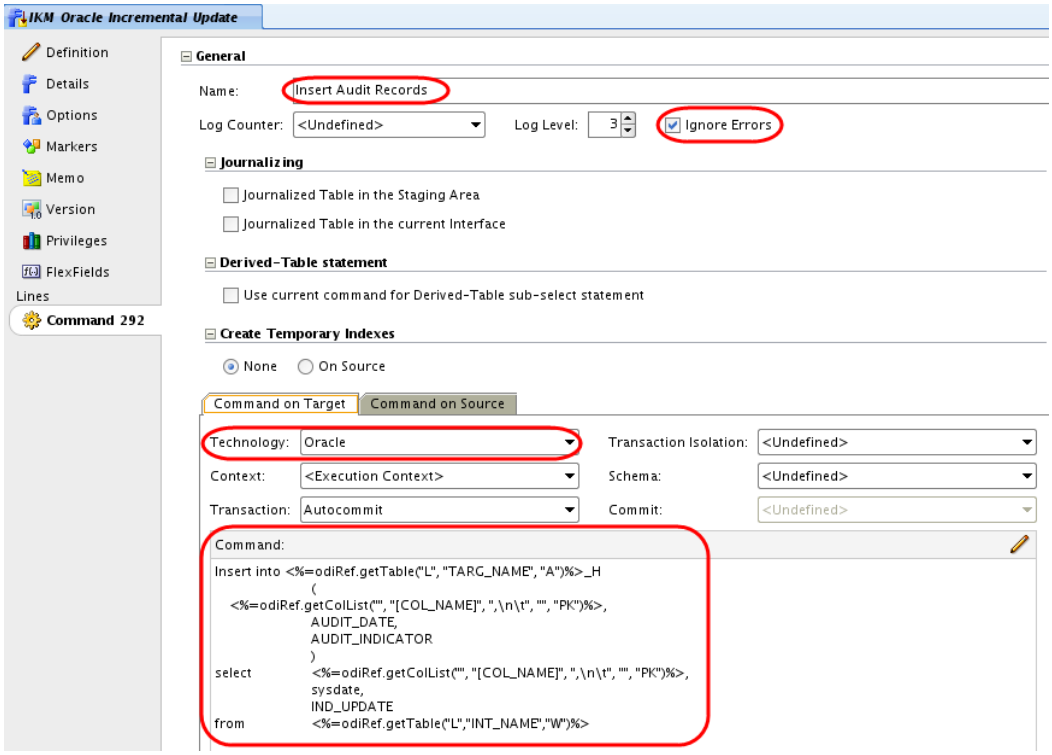
Note: These substitution methods use the following parameters:

GetTable:

- "L": Local naming convention. For example, in Oracle that would be schema.table (versus "R" for remote: schema.table@server).
- "A": Automatic. It enables ODI to determine which physical schema to use (the Data schema ["D"] or the Staging schema ["W"])

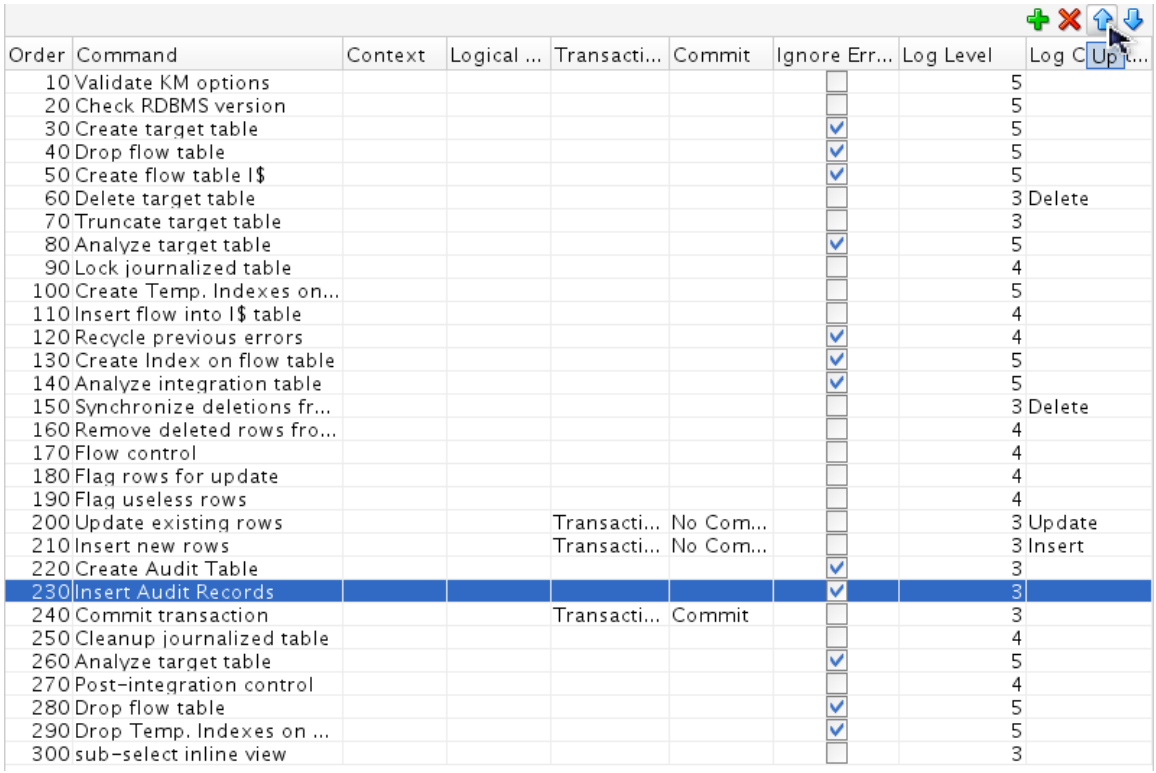
getColList:

- Notice the "PK" parameter. If it is used, only the columns that are part of the primary key are included.



7) Click *Details* tab. Scroll down and select the *Insert Audit Records* command.

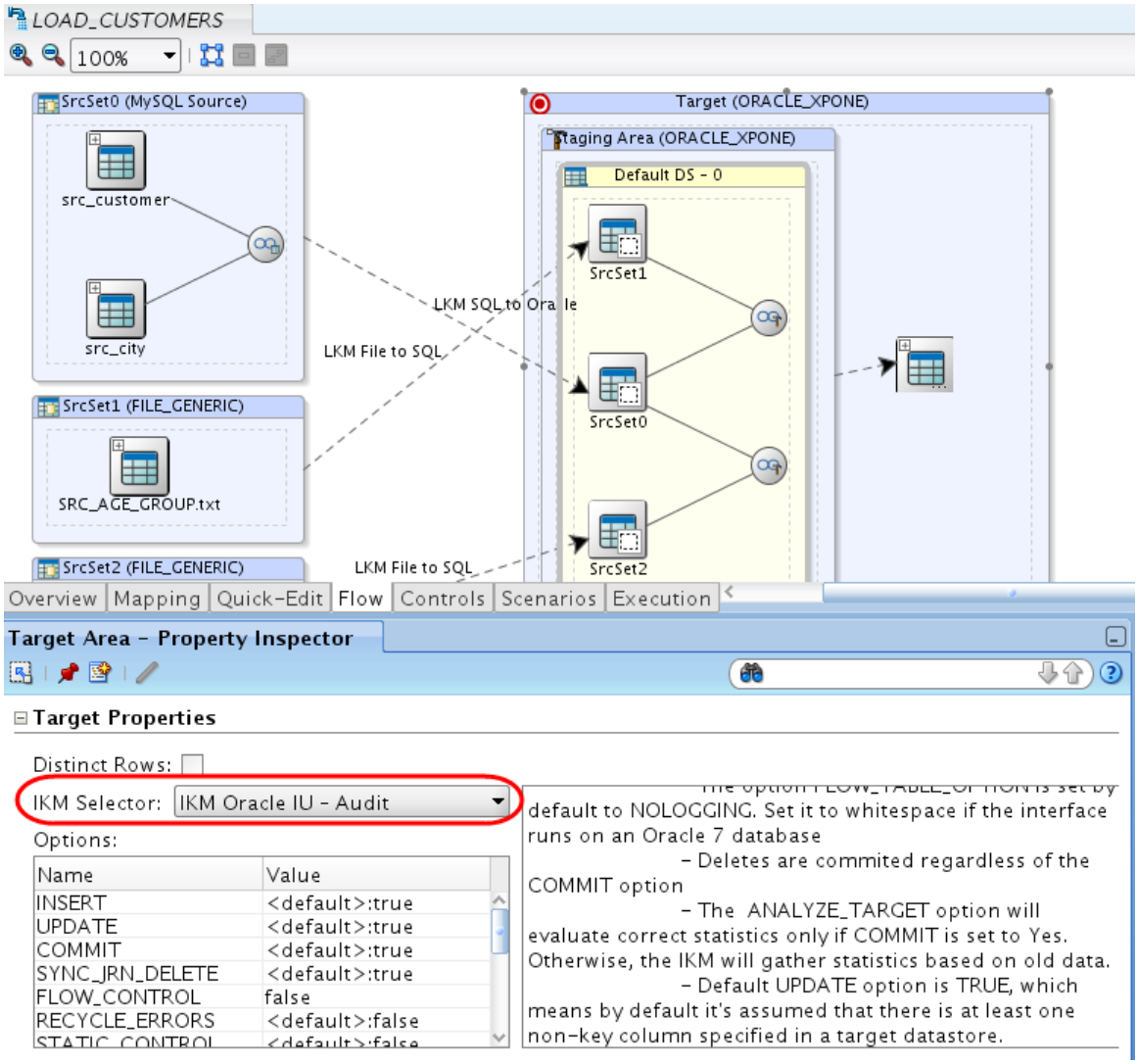
Click the  icon several times to move the command up and place it right after the *Create Audit Table* step, as shown below. Click *Save*, and then close the tab.



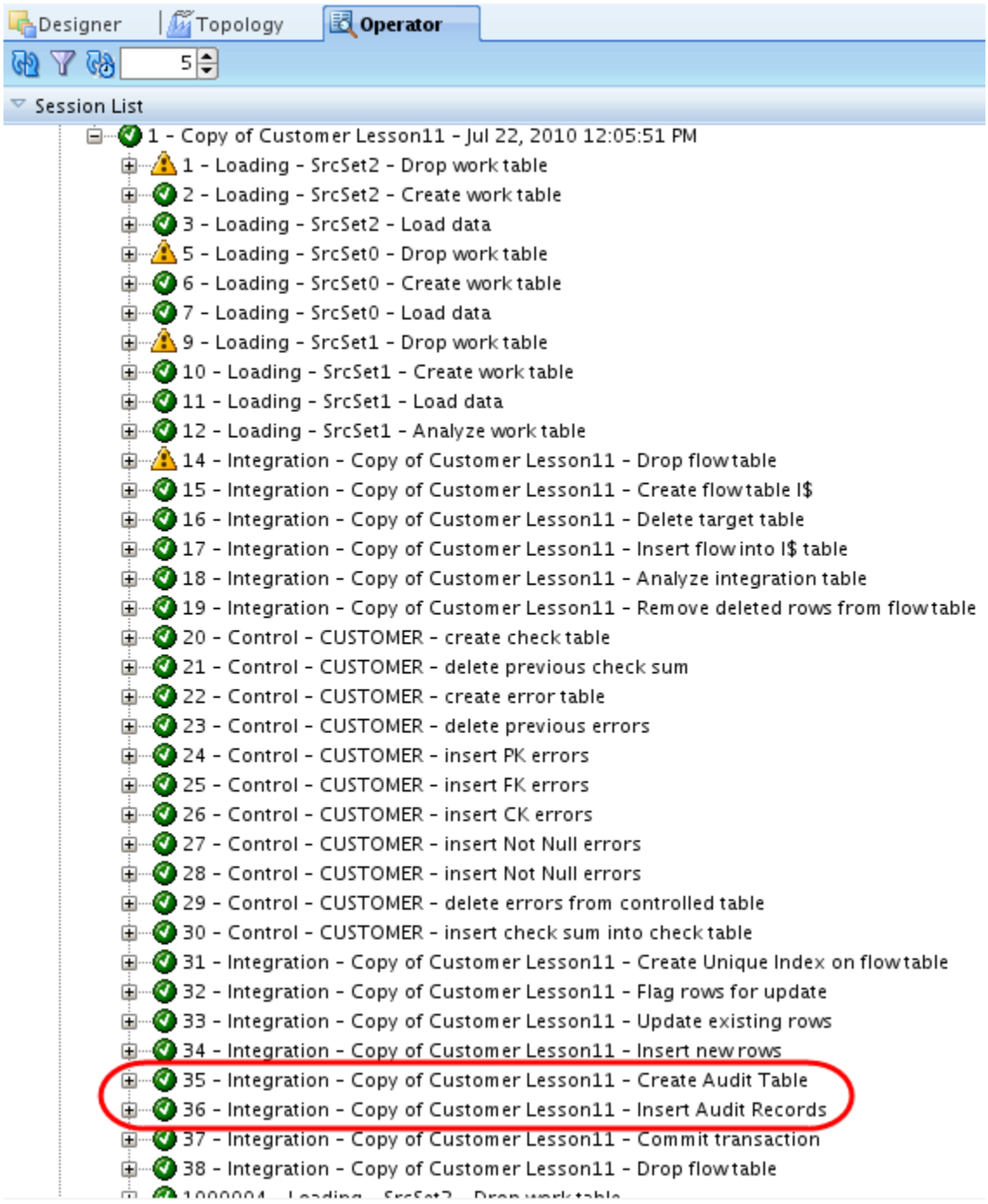
Order	Command	Context	Logical ...	Transacti...	Commit	Ignore Err...	Log Level	Log C...
10	Validate KM options					☐	5	
20	Check RDBMS version					☐	5	
30	Create target table					☑	5	
40	Drop flow table					☑	5	
50	Create flow table I$					☑	5	
60	Delete target table					☐	3	Delete
70	Truncate target table					☐	3	
80	Analyze target table					☑	5	
90	Lock journalized table					☐	4	
100	Create Temp. Indexes on...					☐	5	
110	Insert flow into I$ table					☐	4	
120	Recycle previous errors					☑	4	
130	Create Index on flow table					☑	5	
140	Analyze integration table					☑	5	
150	Synchronize deletions fr...					☐	3	Delete
160	Remove deleted rows fro...					☐	4	
170	Flow control					☐	4	
180	Flag rows for update					☐	4	
190	Flag useless rows					☐	4	
200	Update existing rows			Transacti...	No Com...	☐	3	Update
210	Insert new rows			Transacti...	No Com...	☐	3	Insert
220	Create Audit Table					☑	3	
230	Insert Audit Records					☑	3	
240	Commit transaction			Transacti...	Commit	☐	3	
250	Cleanup journalized table					☐	4	
260	Analyze target table					☑	5	
270	Post-integration control					☐	4	
280	Drop flow table					☑	5	
290	Drop Temp. Indexes on ...					☑	5	
300	sub-select inline view					☐	3	

8) Verify that your new knowledge module *IKM Oracle UI - Audit* appears in the Knowledge Modules tree.

9) Modify the *LOAD_CUSTOMERS* interface to be executed with your newly created knowledge module. Change IKM entry to use *IKM Oracle UI-Audit* in the *Flow* tab. Make sure that in the IKM Selection section, *FLOW_CONTROL* and *STATIC_CONTROL* options are set to false. Save and execute the Interface.


LOAD_CUSTOMERS
100%
SrcSet0 (MySQL Source)
src_customer
src_city
SrcSet1 (FILE_GENERIC)
SRC_AGE_GROUP.txt
SrcSet2 (FILE_GENERIC)
LKM File to SQL
LKM SQL to Ora le
LKM File to SQL
Target (ORACLE_XPONE)
Staging Area (ORACLE_XPONE)
Default DS - 0
SrcSet1
SrcSet0
SrcSet2
Overview
Mapping
Quick-Edit
Flow
Controls
Scenarios
Execution
Target Area - Property Inspector
Target Properties
Distinct Rows:
IKM Selector:
IKM Oracle IU - Audit
Options:
Name
Value
INSERT
<default>:true
UPDATE
<default>:true
COMMIT
<default>:true
SYNC_JRN_DELETE
<default>:true
FLOW_CONTROL
false
RECYCLE_ERRORS
<default>:false
default to NOLOGGING. Set it to whitespace if the interface runs on an Oracle 7 database
- Deletes are commited regardless of the COMMIT option
- The ANALYZE_TARGET option will evaluate correct statistics only if COMMIT is set to Yes. Otherwise, the IKM will gather statistics based on old data.
- Default UPDATE option is TRUE, which means by default it's assumed that there is at least one non-key column specified in a target datastore.

10)In Operator, verify that the audit table was created and populated.

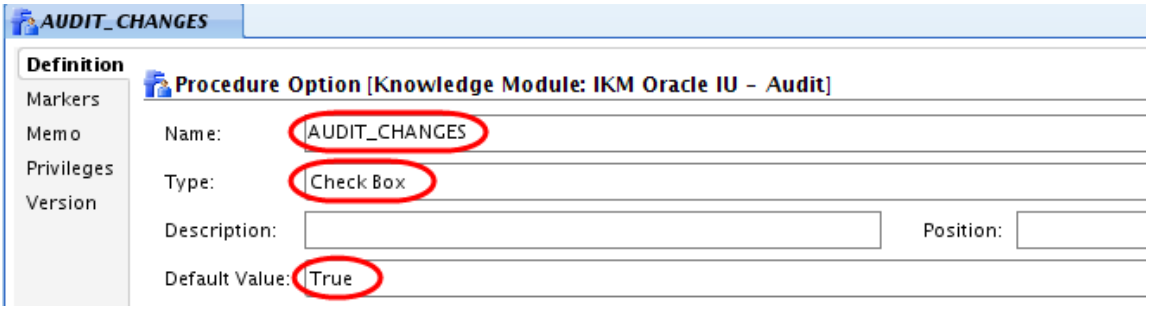


Lab 7.2: Add an Option to your KM

Instructions

To make your KM more user friendly, you can add an option that will let the end-user choose when he/she want to generate audits:

1) Add an option:
   a) In the Projects tab, right-click *IKM Oracle UI – Audit*
   b) Select *New Option*
   c) Name the option AUDIT_CHANGES
   d) Set the type to *Checkbox*
   e) Set the default value to *True*
   f) Save the Option

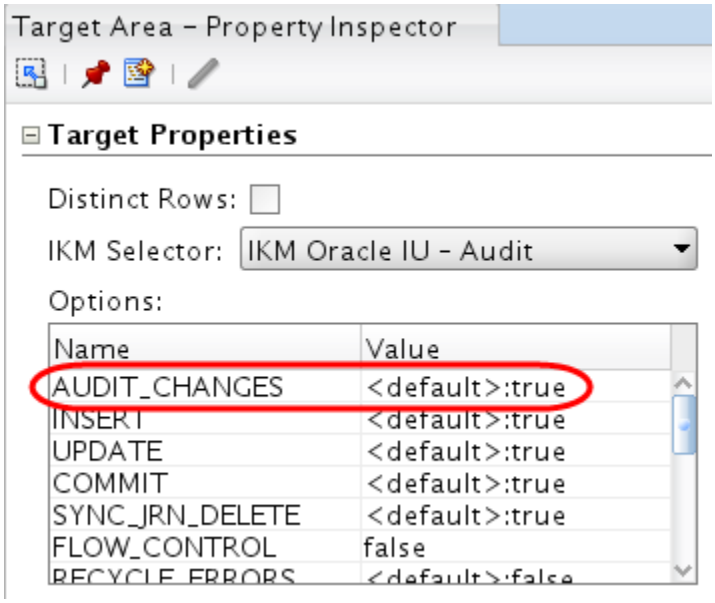


2) Link the option to your steps. For each one of the steps you have created:
   a) In the *Details* section of the KM, double-click your step to open it, and then scroll-down to the bottom and click *Options*
   b) Unselect *Always Execute*
   c) Select *AUDIT_CHANGES*

d) Repeat for every step you created

e) Save and close the IKM. The execution of these steps can now be set by the end-user.

3) In the *Flow* tab of your Interface, click on the *"Target/Staging Area"* box and verify that the *AUDIT_CHANGES* option is set to *True*. Run the Interface, check the behavior in the Operator interface.



4) Change the value to *False*, run the interface again, and compare the generated code in the operator interface.

Lab 8: Variables, Functions, Procedures and Packages

Introduction

Packages: The Package is the largest unit of execution in Oracle Data Integrator. A Package is made up of a sequence of steps organized into an execution diagram. Each step can either succeed or fail its execution. Depending on the execution result (success or failure), a step can branch to another step.

Procedures: A Procedure is a set of commands that can be executed by an agent. These commands concern all technologies accessible by Oracle Data Integrator (OS, JDBC, JMS commands, etc).

A Procedure is a reusable component that allows you to group actions that do not fit in the Interface framework. Procedures should be considered only when what you need to do can't be achieved in an interface. In this case, rather than writing an external program or script, you would include the code in Oracle Data Integrator and execute it from your packages. Procedures require you to develop all your code manually, as opposed to interfaces.

Variables: A variable is an object that stores a single value. This value can be a string, a number or a date. The variable value is stored in Oracle Data Integrator. It can be used in several places in your projects, and its value can be updated at run-time.

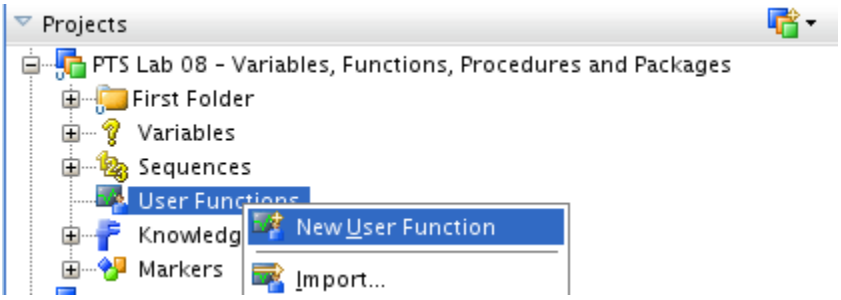
User Functions: User functions are used for defining customized functions that can be used in interfaces or procedures. It is recommended to use them in your projects when the same complex transformation pattern needs to be assigned to different datastores within different interfaces. A function can be created as a global function or in a project.

Lab 8.1: Create a User Function

Instructions

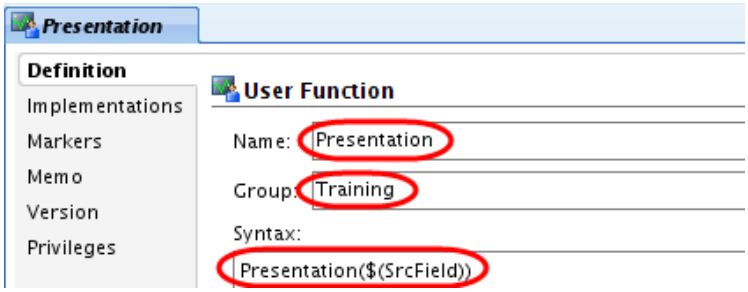
We will first create a User Function to replace the “Case When” operation we have in the *LOAD_CUSTOMERS* interface *Dear* column. Remember to use the dollar sign ($) when using the parameters.

1) Under the *PTS Lab 08 - Variables, Functions, Procedures and Packages* project, create a new User Function



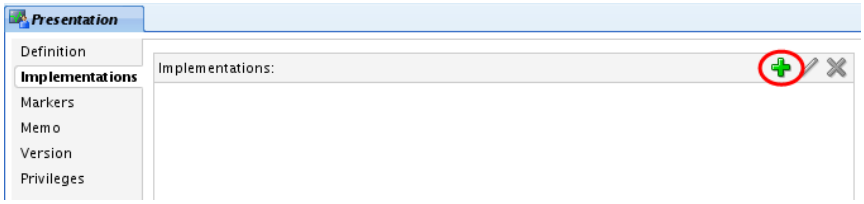
2)Enter a Name for the Function: *Presentation*
Enter a Group name for the Function: *Training*

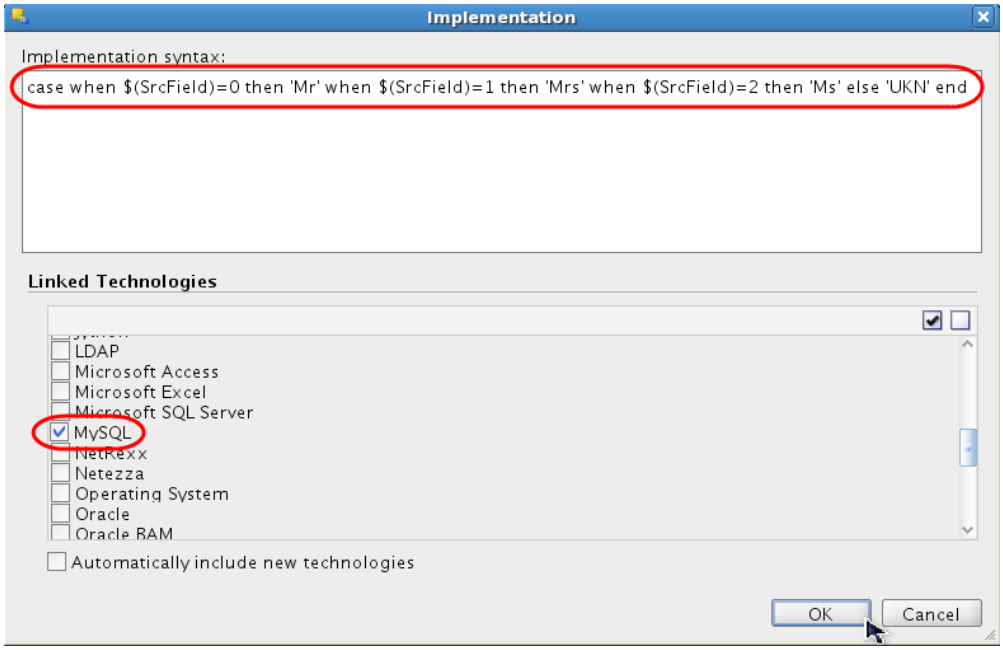
Define the syntax for the User Function: *Presentation($(SrcField))*



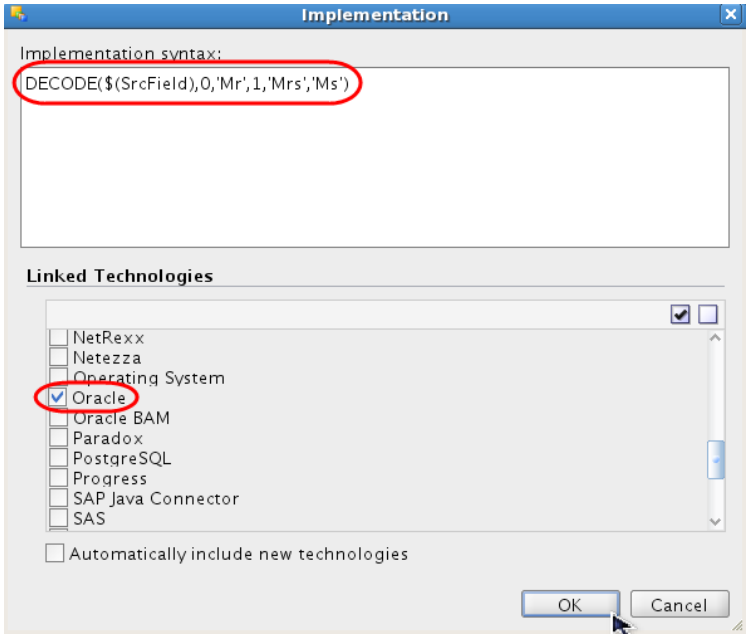
3) Add an Implementation and choose the technology for which you are defining the code. Type the following code for MySQL:

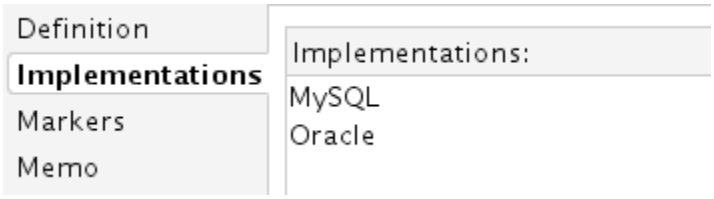
case when $(SrcField)=0 then 'Mr' when $(SrcField)=1 then 'Mrs' when $(SrcField)=2 then 'Ms' else 'UKN' end





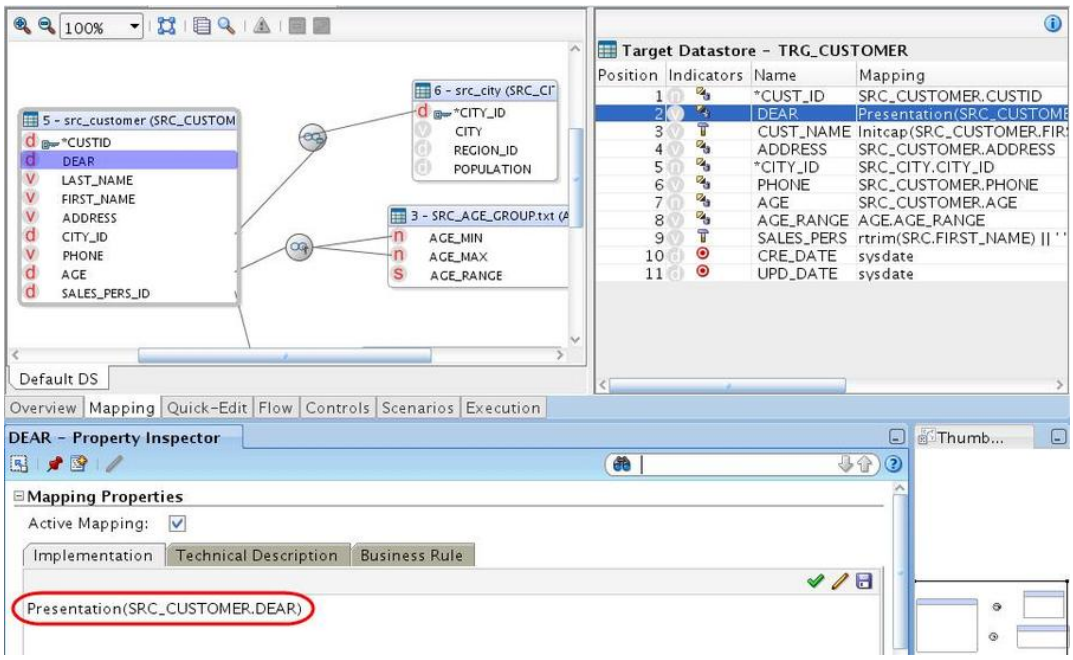
For Oracle, use the following code: DECODE($(SrcField),0,'Mr',1,'Mrs','Ms')



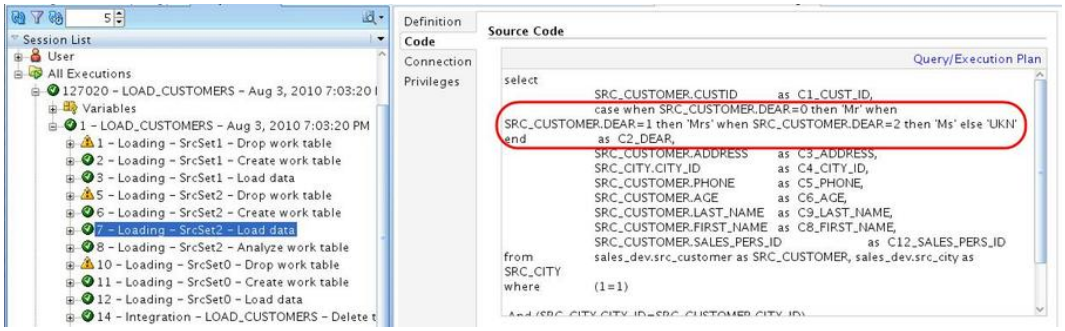


4) Save the Function. In the *LOAD_CUSTOMERS* interface, replace the initial mapping for the *DEAR* column with the user function:

Presentation(SRC_CUSTOMER.DEAR)



5) Save and execute the interface. Check the generated code in the operator interface. Notice that the function has been replaced with the implementation code at runtime.

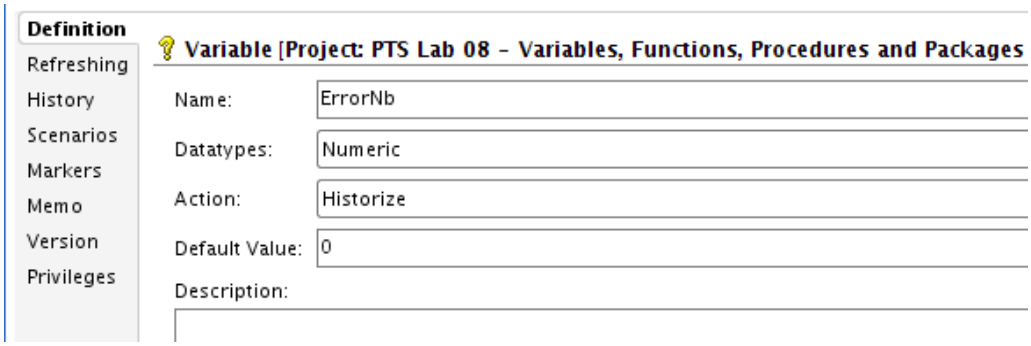


Lab 8.2: Variables

Instructions

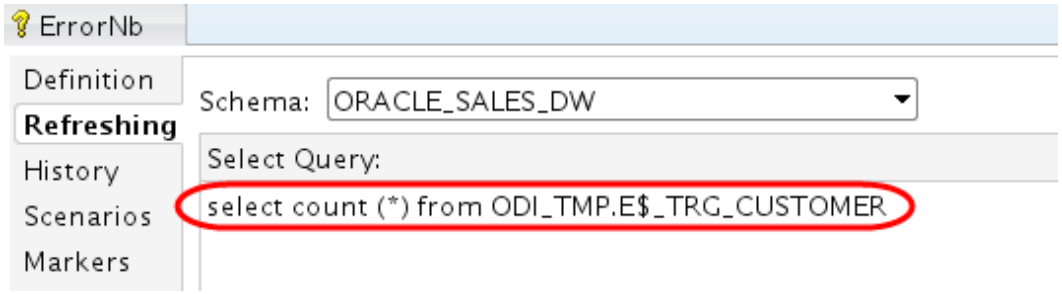
We will now use a variable to count the number of errors in the Customers data load. The objective here is to evaluate if we have identified errors, and to have ODI behave differently if we do.

1) Create a new variable. Variables can be local to a project or global for all projects. In this exercise, we will create a local variable. Call the variable *ErrorNb* (Datatype: Numeric, Action: Historize, Default value: 0).



In the *Refreshing* tab of the variable, select the *ORACLE_SALES_DW* schema and type the following query that will return the number of errors for the Customers table:

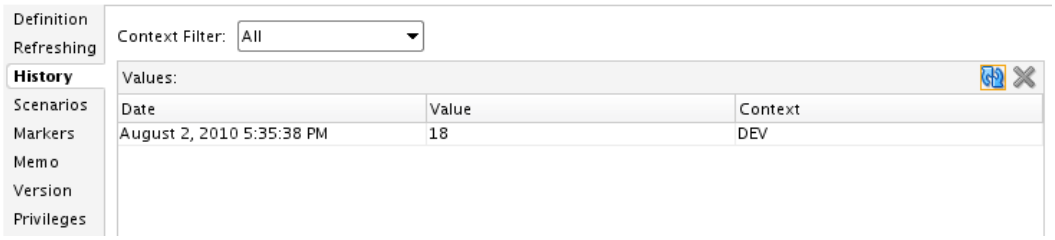
select count(*) from ODI_TMP.E$_TRG_CUSTOMER



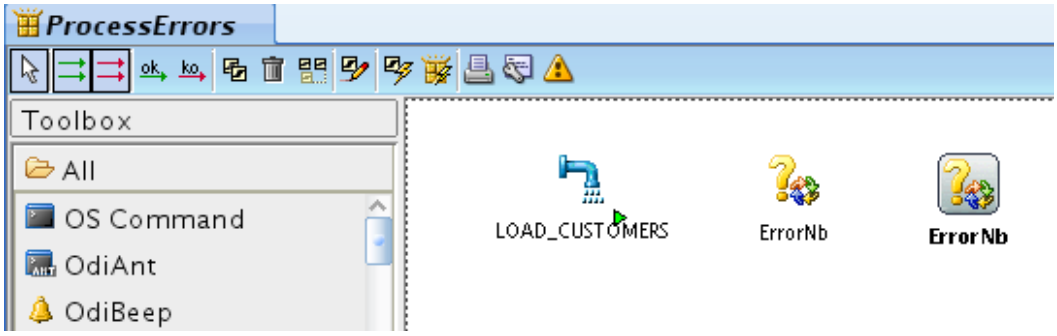
Note that the logical schema has been selected to point to the appropriate table. A more robust way to write this query is to use ODI substitution APIs to re-build the qualified name of the table:

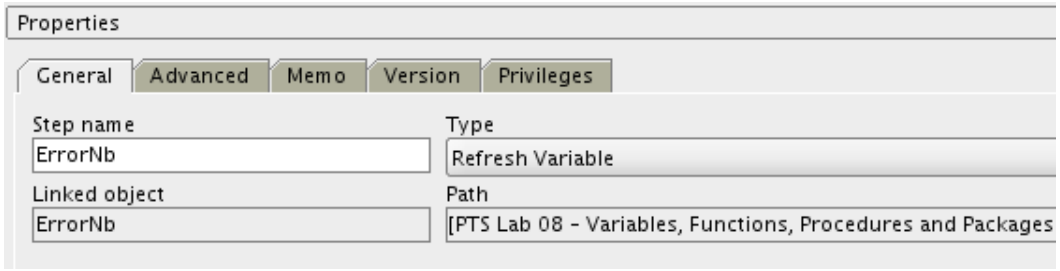
Select count(*) from <
%=odiRef.getObjectName("L","E$_TRG_CUSTOMER","W")%>

When you click the *Refresh* button, you can follow up the processing of the queries in the Operator interface. The History tab will keep track of the values taken by the variable:

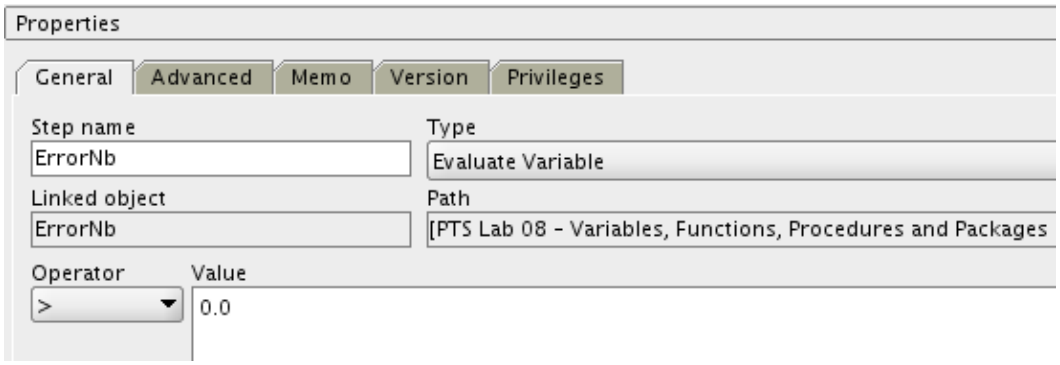


2) Test the variable in a package. Create a new package called *ProcessErrors*. . In the *Diagram* tab, drag and drop the LOAD_CUSTOMERS interface and the variable twice in the package *ProcessErrors*. For the first variable, set the operation to *Refresh Variable*.

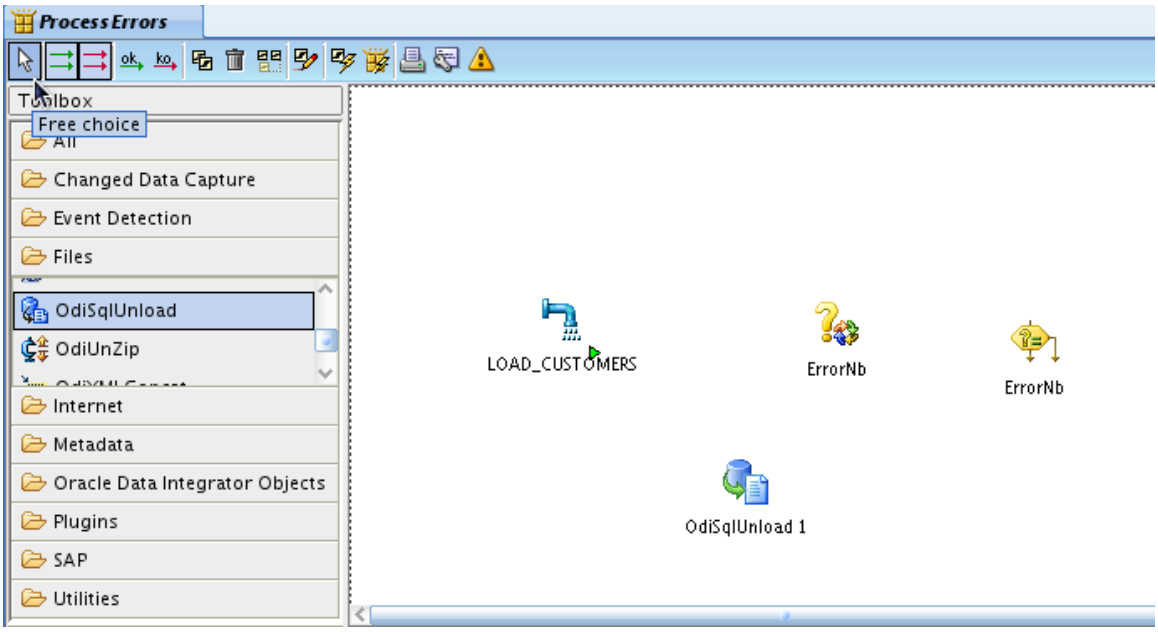




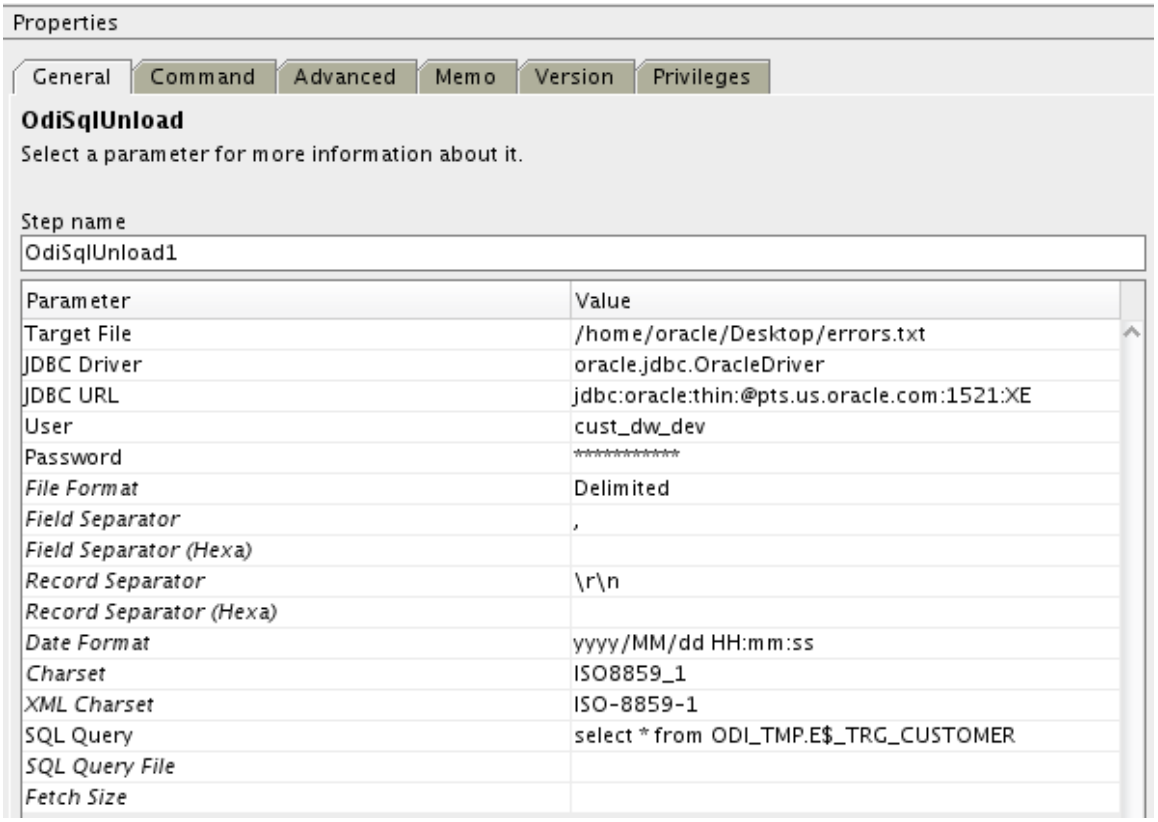
3) For the second variable, set the operation to *Evaluate Variable*. Your evaluation is whether the value of *ErrorNb* is greater than zero. (Due to the way ODI processes numbers, use the value 0.0 for your comparison).



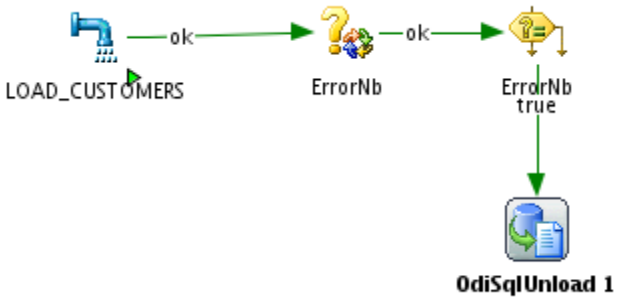
4) Save these errors in a flat file (to email the contents to an administrator for instance). Use *OdiSQLUnload* to dump the contents of the error table to a csv file on the desktop. Under Files, highlight *OdiSQLUnload* and then click mouse in the diagram pane. Click Free Choice arrow icon in ToolBox to disable selection.



5) Fill in the information for *OdiSQLUnload* with the information below (password and user are both *cust_dw_dev*)



6) Click the *Next Step on Success* tool icon  on the Package toolbar. Click the *LOAD_CUSTOMERS* step, then press and hold the left mouse button and move the cursor over the first *ErrorNB* variable step. Then, release the mouse button. A green arrow appears between these steps. Repeat to connect the second variable step and the *odiSqlUnload* step.



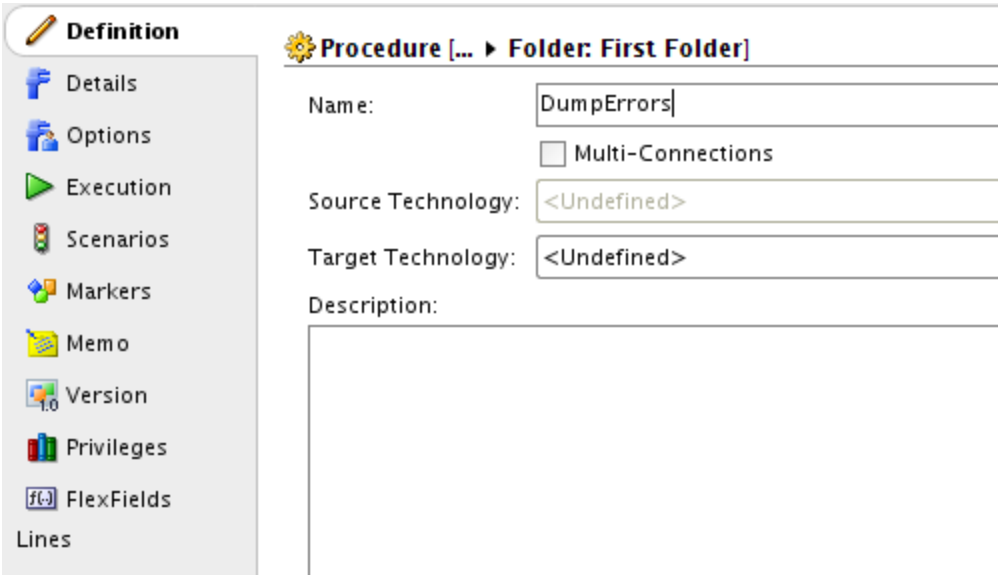
7) Click Save to save the package. Execute the package. Check the operator for any errors and view the errors file on the Desktop.

Lab 8.3: Procedures

Instructions

One of the big advantages of Procedures is its reusability. Oftentimes, the same steps occur over and over again in different packages. Instead of recreating those steps in each package, you can create a procedure for the step(s) and use it in multiple packages.

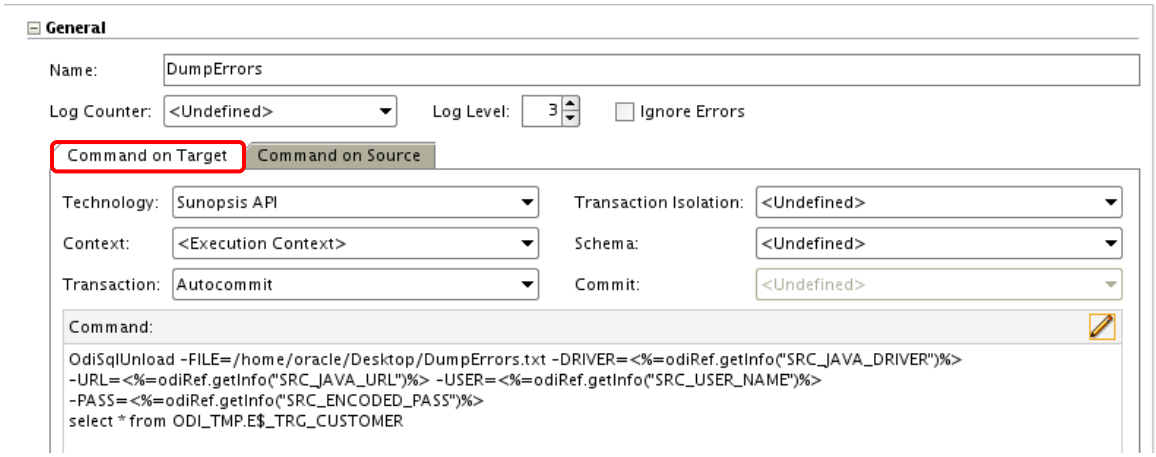
1) Create a Procedure call *DumpErrors*.



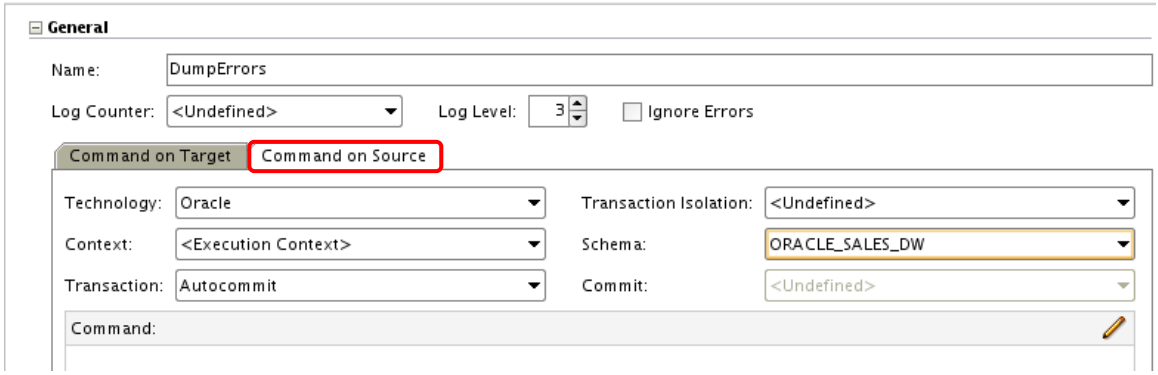
2) Add a step in the *Details* tab. In the *Command on Target* tab, name the step *DumpErrors*, set the Technology to *Sunopsis API*, and type the following command:

```
OdiSqlUnload -FILE=/home/oracle/Desktop/DumpErrors.txt -DRIVER=<
%=odiRef.getInfo("SRC_JAVA_DRIVER")%> -URL=<
%=odiRef.getInfo("SRC_JAVA_URL")%> -USER=<
%=odiRef.getInfo("SRC_USER_NAME")%> -PASS=<
%=odiRef.getInfo("SRC_ENCODED_PASS")%>

select * from ODI_TMP.E$_TRG_CUSTOMER
```

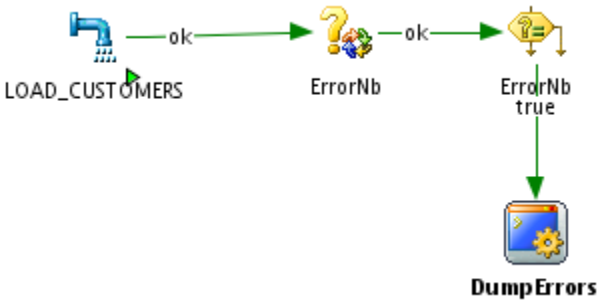
Note that there is only one carriage return, just before the *select* key word



In the *Command on Source* tab, set the Technology to *Oracle* and the Schema to *ORACLE_SALES_DW.* Save and close.



3) Replace the *OdiSQLUnload* step in the *ProcessErrors* package with this procedure. Run the package and view the file placed on the Desktop.



Lab 9: Workflows and Scenarios

Introduction

As described in Lab 8, the **package** is the largest unit of execution in Oracle Data Integrator. A package is a workflow, made up of a sequence of steps organized into an execution diagram. Each step can either succeed or fail its execution. Depending on the execution result (success or failure), a step can branch to another step.

Packages assemble and reference other components from a project such as interfaces, procedure or variable.

A **scenario** is designed to put a source component (interface, package, procedure, variable) into production. Remember an interface, procedure, or package can be modified at any time. A scenario is created by generating code from such an object. It thus becomes frozen, but can still be executed on a number of different environments or contexts. Because a scenario is stable and ready to be run immediately, it is the preferred form for releasing objects developed in ODI.

Scenarios can also be versioned. Scenarios can be launched from a command line, from the Oracle Data Integrator Studio and can be scheduled using the built-in scheduler of the run-time agent or an external scheduler.

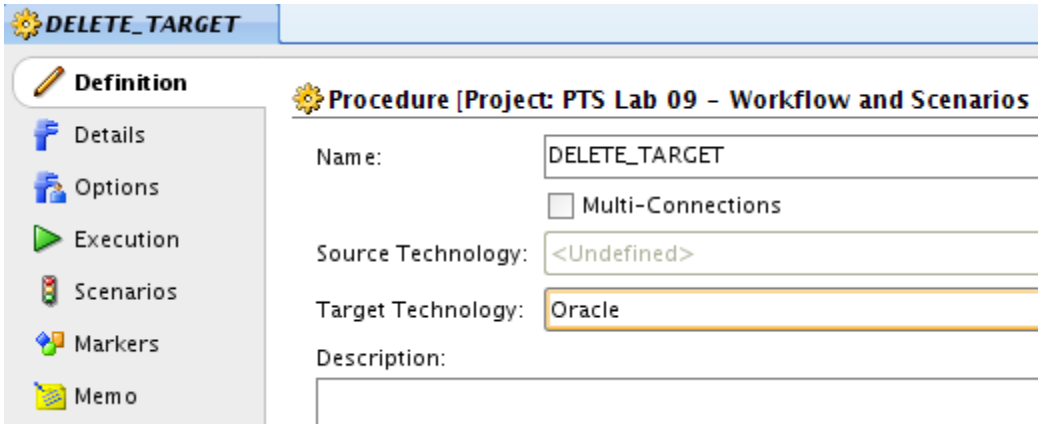
Lab 9.1: Create a Workflow

Instructions

A common task that is performed using ODI is to create a package that executes a number of objects (Interfaces, Procedures) in the flow.

1) Create a procedure *DELETE_TARGET* for deleting the *TRG_CUSTOMER, TRG_CITY, TRG_REGION, and TRG_COUNTRY* tables.

   Name: *DELETE_TARGET*
   Technology: *Oracle*



2) Add a step in the Details tab and enter the following information:

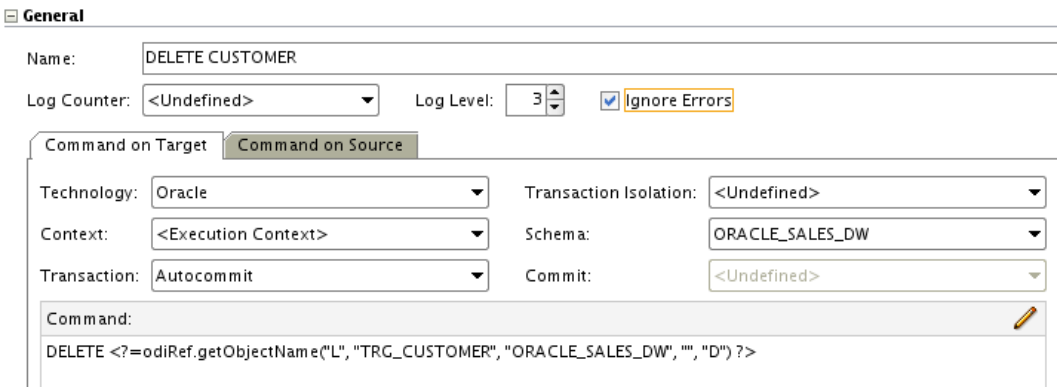
Name: *DELETE CUSTOMER*

Schema: *ORACLE_SALES_DW*

Select *Ignore Errors* checkbox.

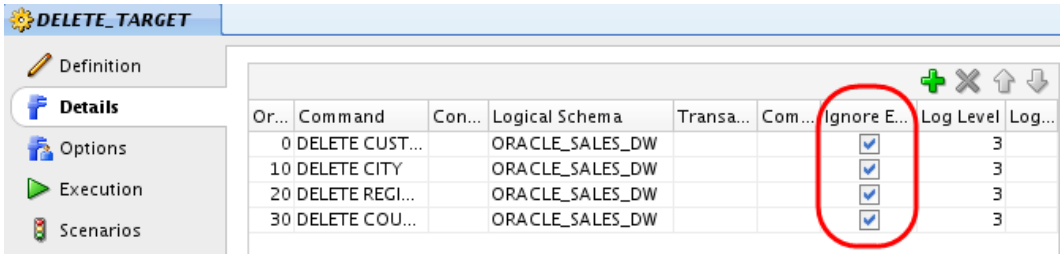
Command:

DELETE <?=odiRef.getObjectName("L", "TRG_CUSTOMER", "ORACLE_SALES_DW", "", "D") ?>



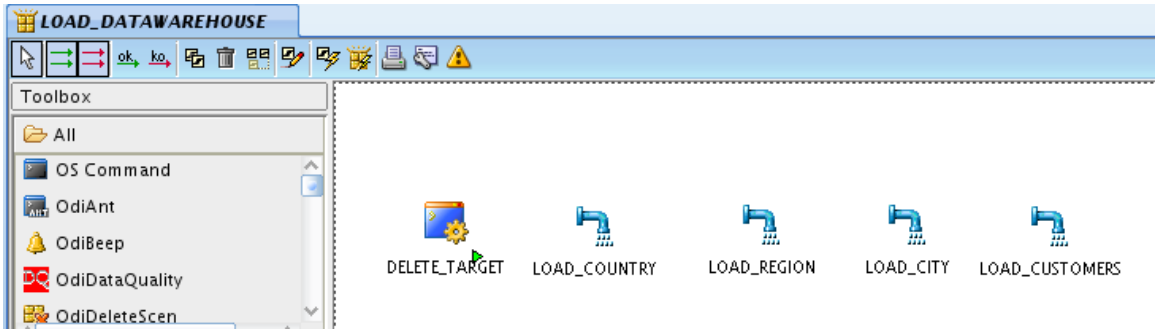
This method returns the table name with run time dependent information, such as the Oracle schema name that may vary depending on the context and topology. Select the details tab.

3) Repeat the two previous steps to create commands *DELETE CITY*, *DELETE REGION*, and *DELETE COUNTRY* that deletes the *TRG_CITY, TRG_REGION and TRG_COUNTRY* tables. Ensure that the correct schema has been chosen and that *Ignore Errors* has been selected for each.

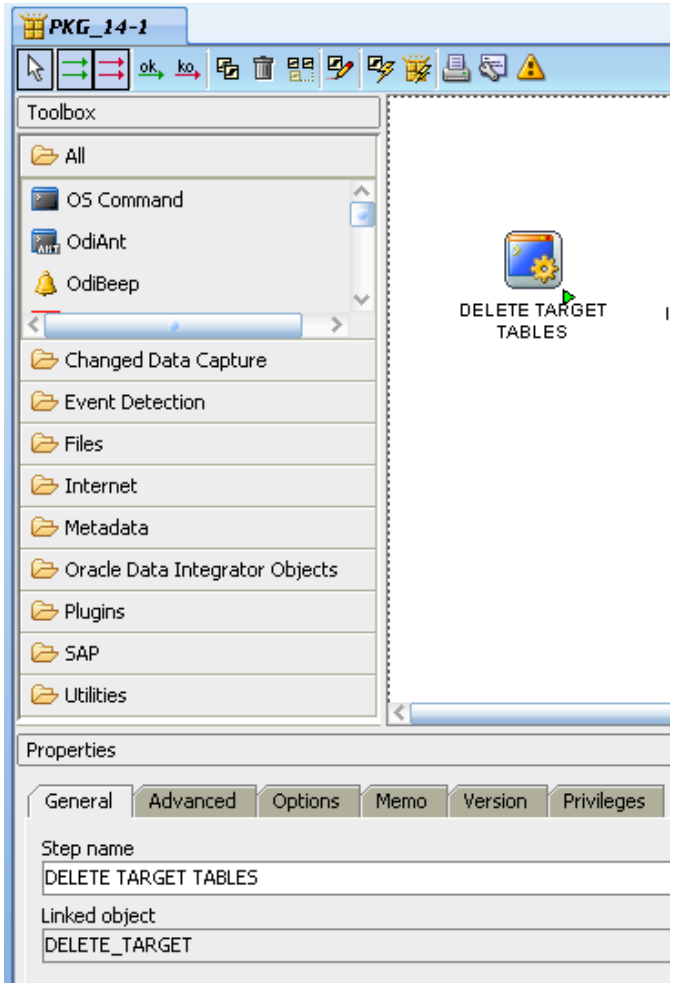


4) Save and close the Procedure.

5) Create a Package called *LOAD_DATAWAREHOUSE*. In the *Diagram* tab, drag the *DELETE_TARGET* procedure from the tree view. Next, drag the LOAD_COUNTRY, LOAD_REGION, LOAD_CITY, and LOAD_CUSTOMERS interfaces.



6) Edit Step *DELETE_TARGET* to *DELETE TARGET TABLES* as shown in the following screenshot below. In the diagram, click empty space to see the new name.



7) Click the *Next Step on Success* tool icon on the Package toolbar. Click the *Delete Target Tables* step. Press and hold the left mouse button and move the cursor over the *LOAD_CUSTOMERS* step. Then, release the mouse button. A green arrow appears between these steps. Repeat until all the objects are connected.

8) Save and execute the package. Go to Operator to verify that the package ran successfully.

Lab 9.2: Scenarios

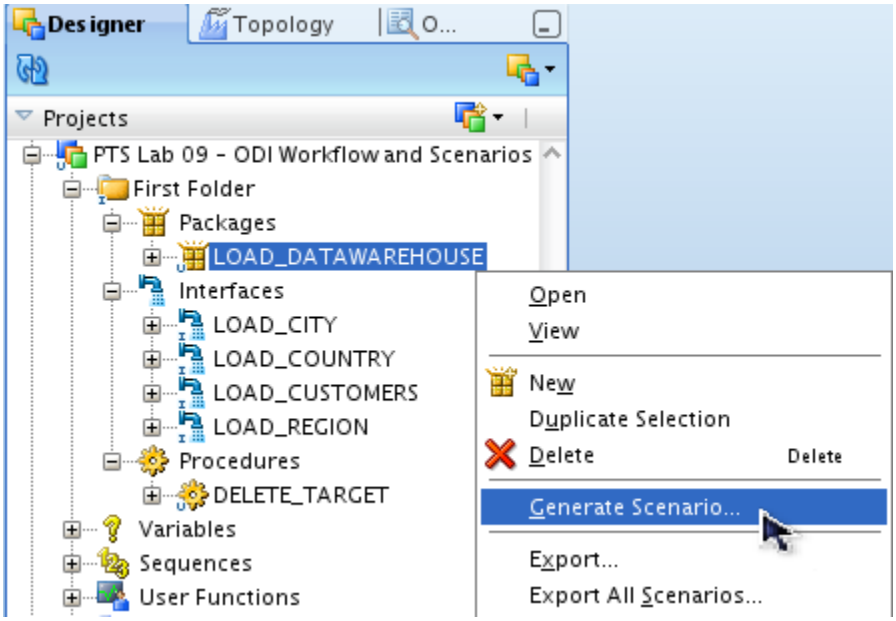
Prerequisites

If you have not already started the local agent deployed as stand alone agent, start it by following instructions provided in Lab 2.3.2 Components Access. Open new terminal window and type in the command id > **startLocalAgent**.

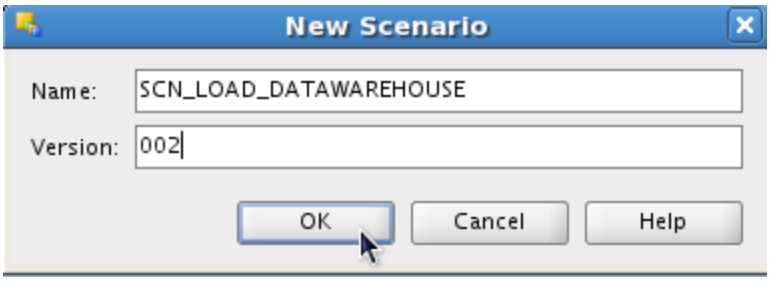
Instructions

We will now create a scenario and schedule it to run at a later time.

1) Right-click the just completed package and select *Generate Scenario*.

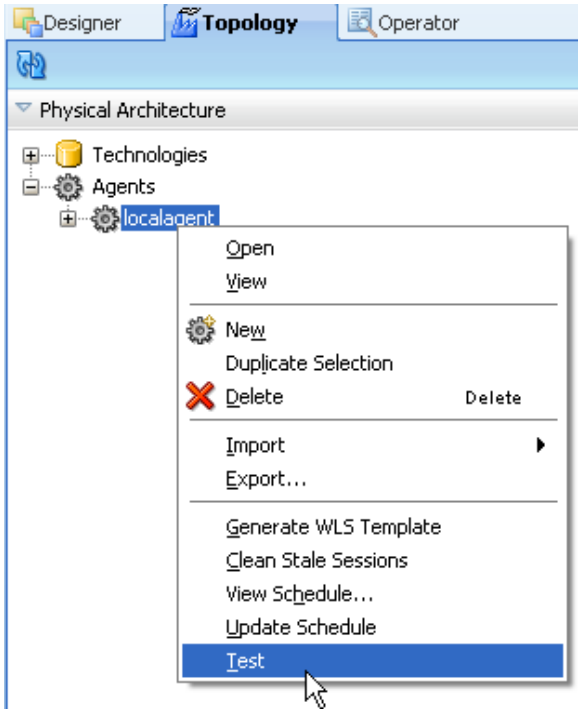


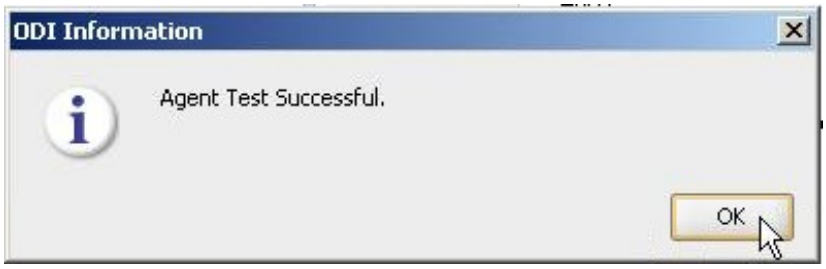
2) Name the scenario SCN_*LOAD_DATAWAREHOUSE*. Set the Version to *002*. Click OK.



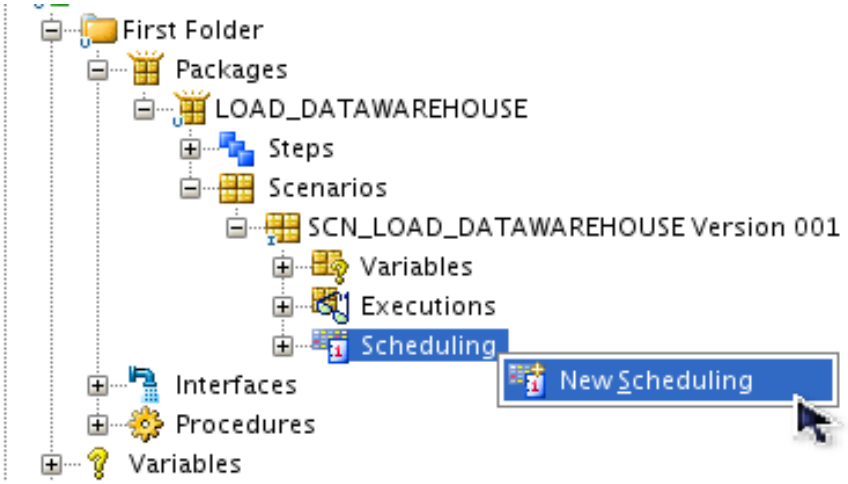
Note: The scenario has now been successfully created. You can now execute the scenario directly, use the scenario within a package, or schedule the scenario within ODI.

3) To schedule the scenario, go to the Topology Navigator and verify connection to the ODI agent, as shown below.

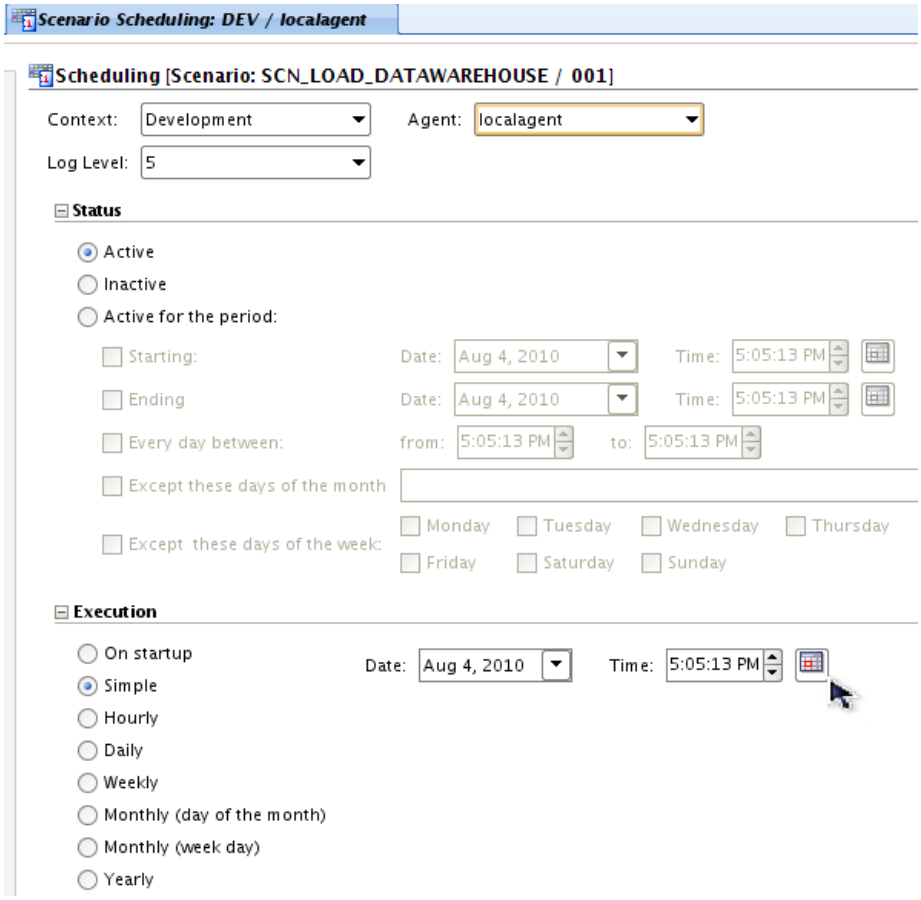


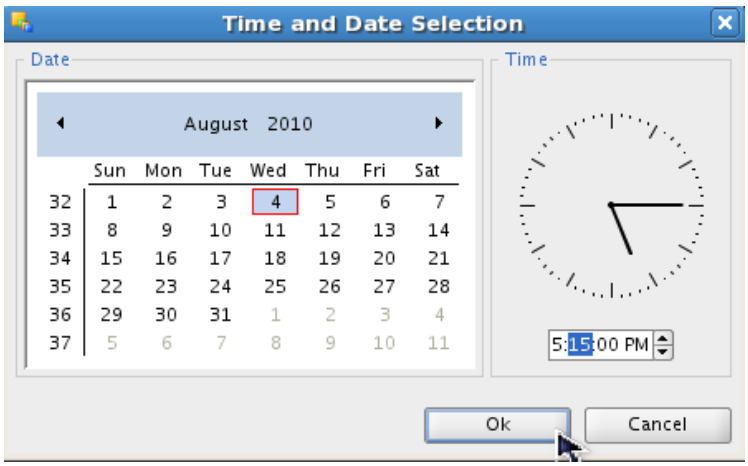


4) Expand the *SCN_LOAD_DATAWAREHOUSE* scenario. Expand *Packages* > *LOAD_DATAWAREHOUSE* > *Scenarios* > *SCN_LOAD_DATAWAREHOUSE Version 002*. Right-click *Scheduling* and select *New Scheduling*.

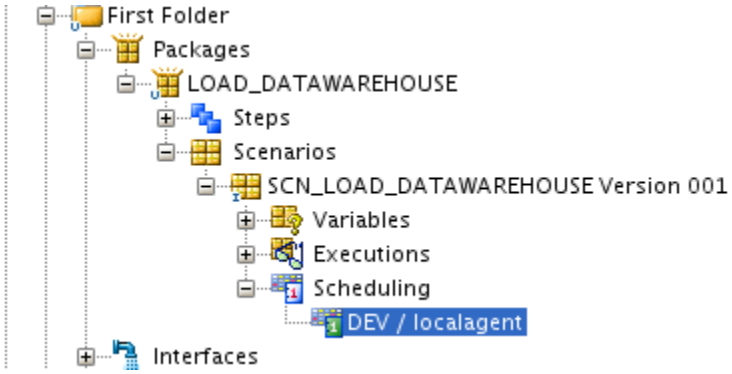


5) On the screen that follows, select the agent where the scheduled scenario will run: localagent. Set Context as Development and log level to 5. Set Execution to Simple and click the button. Set the execution time to approximately 5 minutes from the current system time as shown in the following screenshot. Click *OK* and save the scheduled scenario.

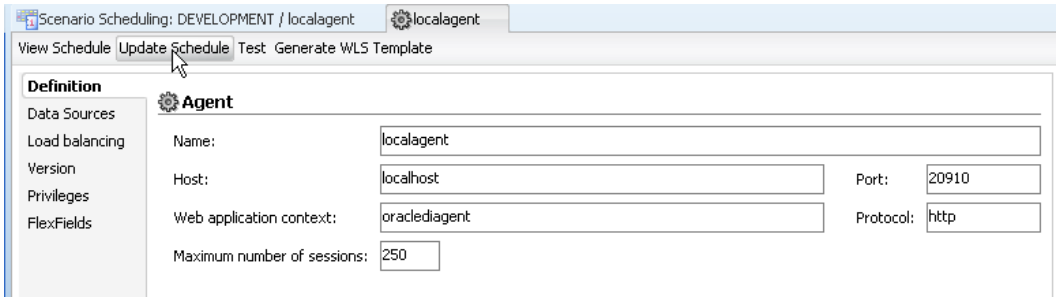

Scenario Scheduling: DEV / localagent
Scheduling [Scenario: SCN_LOAD_DATAWAREHOUSE / 001]
Context: Development
Agent: localagent
Log Level: 5
Status
Active
Inactive
Active for the period:
Starting: Date: Aug 4, 2010 Time: 5:05:13 PM
Ending Date: Aug 4, 2010 Time: 5:05:13 PM
Every day between: from: 5:05:13 PM to: 5:05:13 PM
Except these days of the month
Except these days of the week: Monday Tuesday Wednesday Thursday Friday Saturday Sunday
Execution
On startup
Simple
Hourly
Daily
Weekly
Monthly (day of the month)
Monthly (week day)
Yearly
Date: Aug 4, 2010
Time: 5:05:13 PM

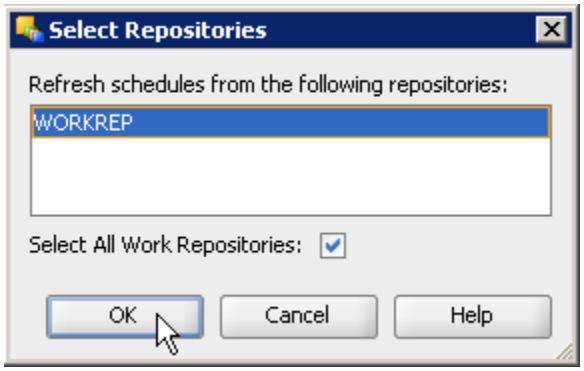

Time and Date Selection
Date
Time
August 2010
Sun Mon Tue Wed Thu Fri Sat
32 1 2 3 4 5 6 7
33 8 9 10 11 12 13 14
34 15 16 17 18 19 20 21
35 22 23 24 25 26 27 28
36 29 30 31 1 2 3 4
37 5 6 7 8 9 10 11
5:15:00 PM
Ok
Cancel

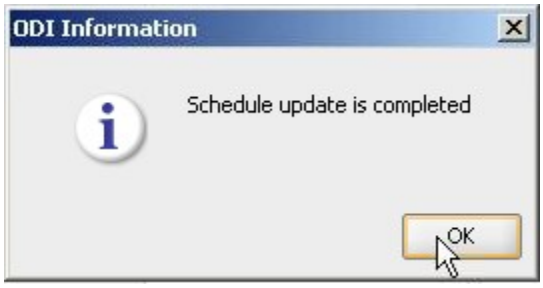
6) Expand Scheduling and verify that the DEVELOPMENT / localagent entry is now inserted under Scheduling.



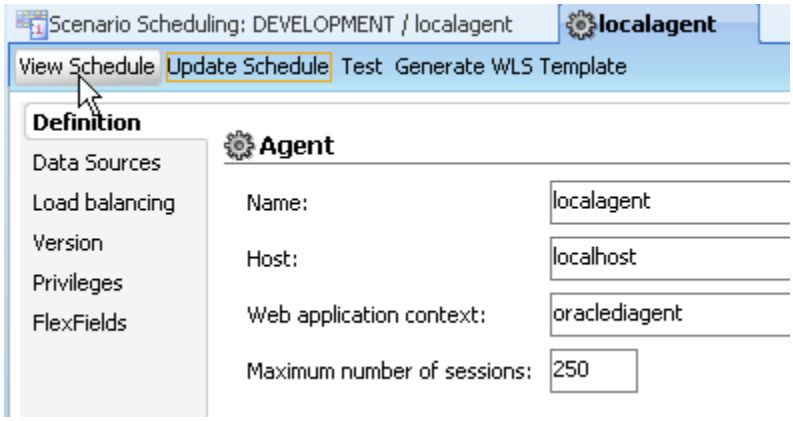
7) Go to Topology to review the scheduling of the Agent. In the Physical architecture, expand the Agents node, double-click *localagent*. On the *localagent* screen, click Update Schedule. On the screen that follows, click OK. Click OK again.

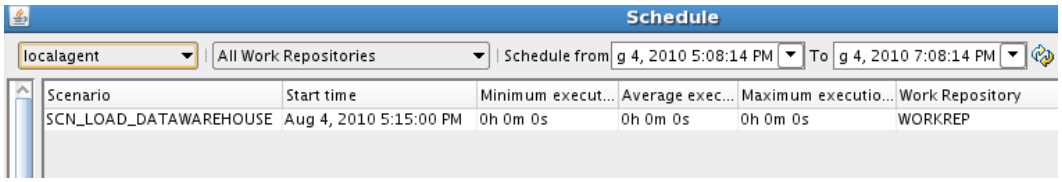






8) Click the View Schedule button. The screen that appears shows you the scheduling information.





9) Open ODI Operator to verify the execution of the scheduled scenario. In ODI Operator, click the Session List tab. Wait until the scheduled execution time to view the execution results, and then click the Refresh iconExpand: Physical Agent > localagent -2> SCN_LOAD_DATAWAREHOUSE, and view the execution results for the SCN_LOAD_DATAWAREHOUSE package. Note the execution time of this scenario. That is the time that you scheduled with ODI Agent. You have now successfully scheduled a scenario with an agent scheduler.

Lab 10: Advanced Interface – Complex Transformation

Introduction

Recall in Lab 3, an integration interface consists of a set of rules that define the loading of a datastore or a temporary target structure from one or more source datastores.

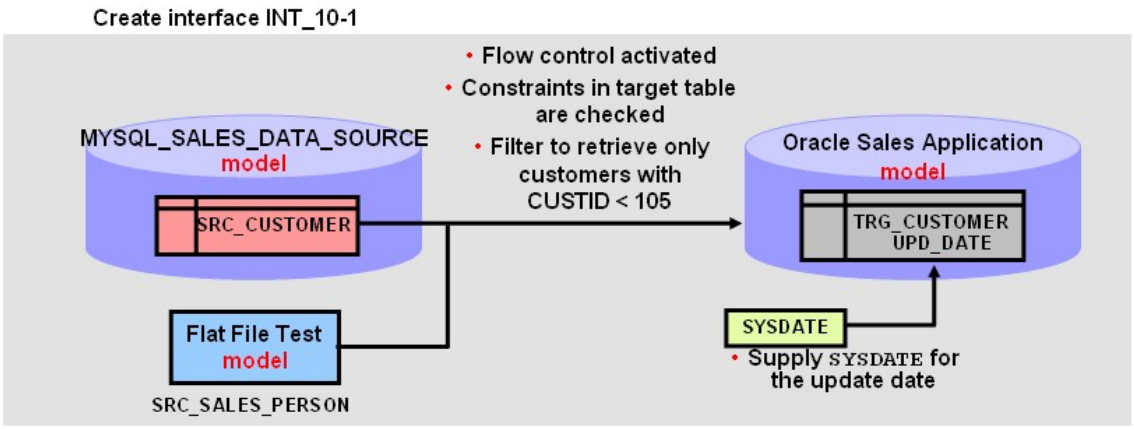
After the data has been extracted and loaded, the next step is to transform the data according to a set of business rules. The data transformation may include various operations including, but not limited to filtering, sorting, aggregating, joining data, cleaning data, generating calculated data based on existing values, and validating data.

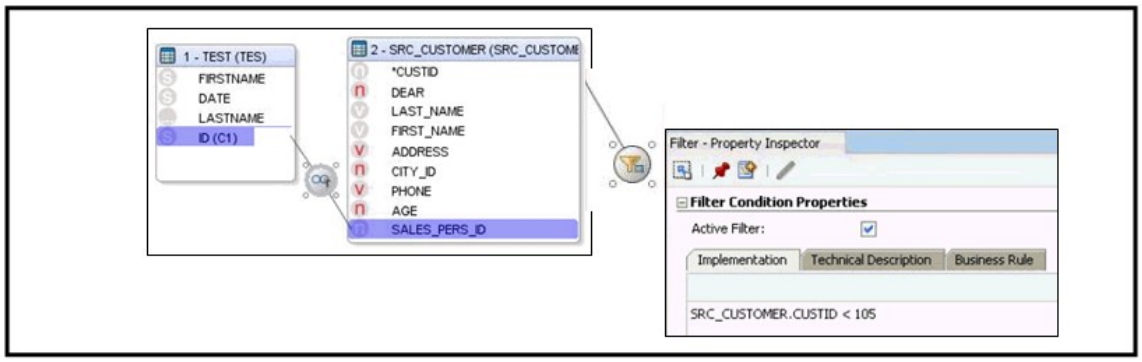
Each business rule is expressed as SQL code that is dependent on the given technology. This SQL code can then make use of other types of ODI objects such as variables and sequences (numeric variables that increment automatically each time they are used), user-defined functions, and substitution methods defined in the ODI substitution API.

Process Overview

In previous labs, you learned how to create a simple ODI Interface.

In this lab, you create a more complex interface with several sources to load the TRG_CUSTOMER datastore in the Oracle Sales Application model with the content of SRC_CUSTOMER table and the SRC_SALES_PERSON files from different models. You apply filtering to retrieve only customers with CUST_ID < 105. In addition, you populate the update date (UPD_DATE) column with System date in the mapping implementation field.





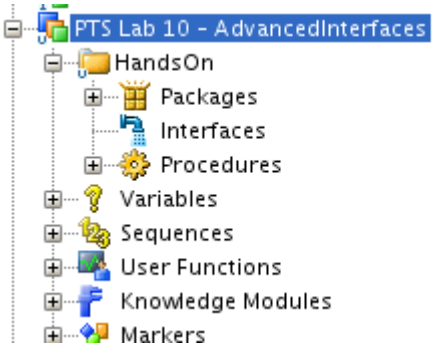
Scenario

You created the interfaces to pass data between models and perform simple ELT transformations. Now you need to create a more complex interface to load data in the target model from different sources. You also need to perform some data transformation, filtering, and provide a date when data was updated.

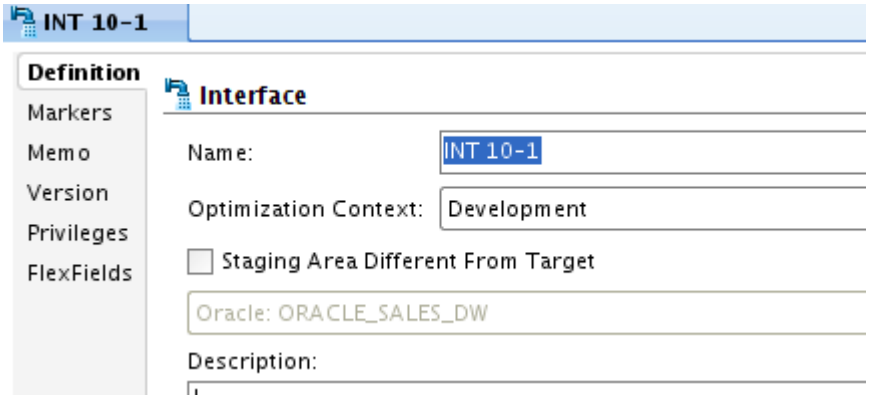
Instructions

1) Create an interface called INT_10-1 loading the TRG_CUSTOMER datastore in the Oracle Sales Application model.

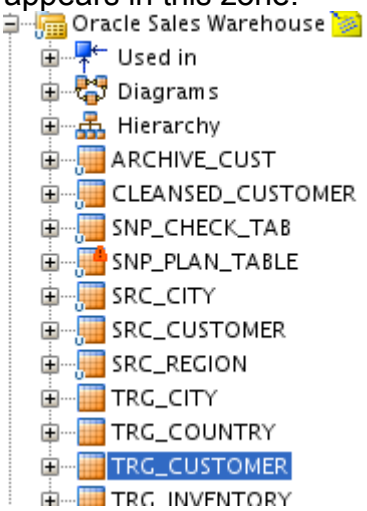
a) In ODI Designer, open the PTS Lab 10- Advanced Interfaces, and then the Interfaces node. Right-click and select New Interface.

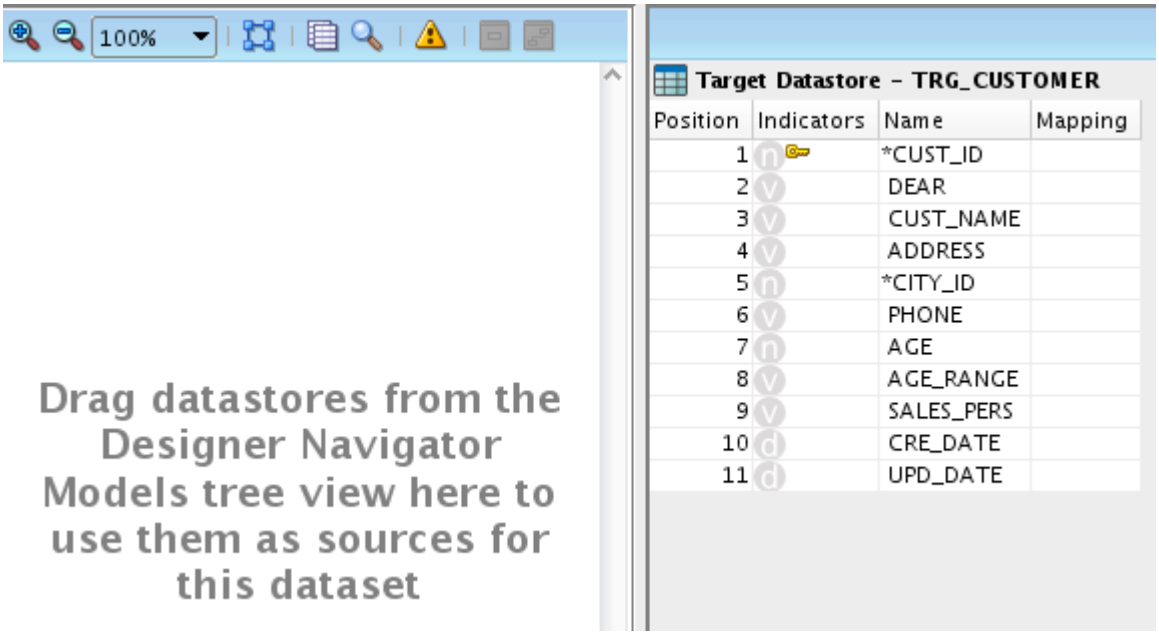


b) In the Interface: NEW window, enter INT_10-1, and then click the Mapping tab.

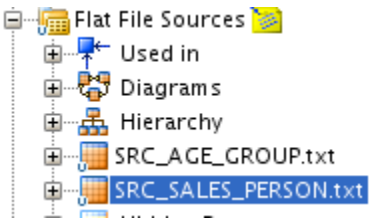


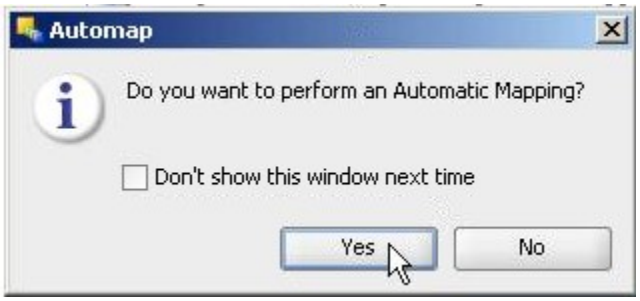
c) In the Designer Navigator, click the Models tab, and then in the tree view expand the Oracle Sales Warehouse model. Drag the TRG_CUSTOMER datastore from the tree view to the Target Datastore zone. The datastore appears in this zone.

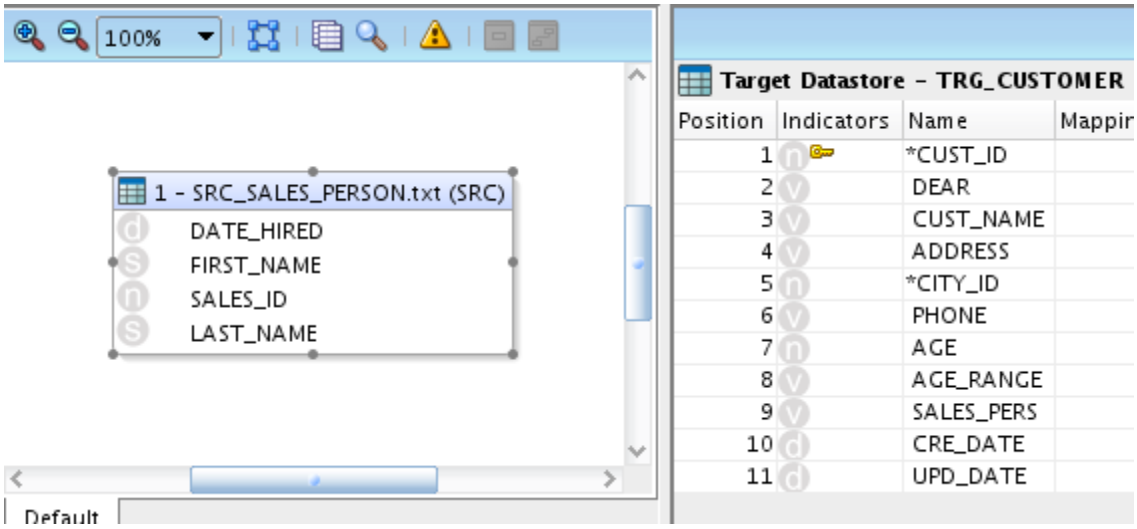




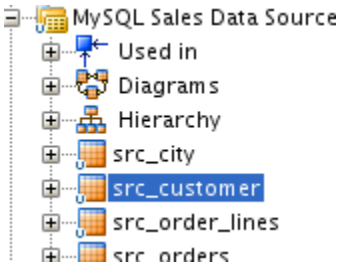
d) In the Design Navigator Models tab, expand the Flat SRC model. Drag the SRC_SALES_PERSON.txt datastore to the Sources zone of your diagram.

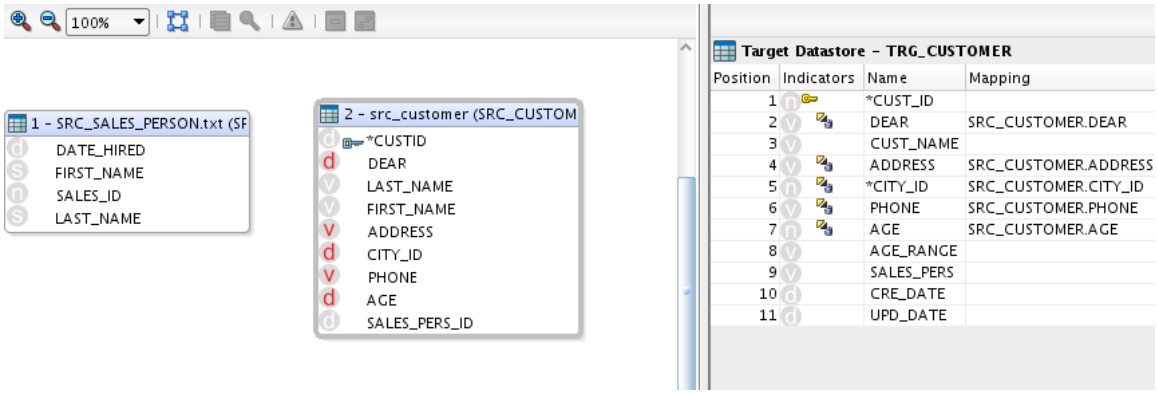




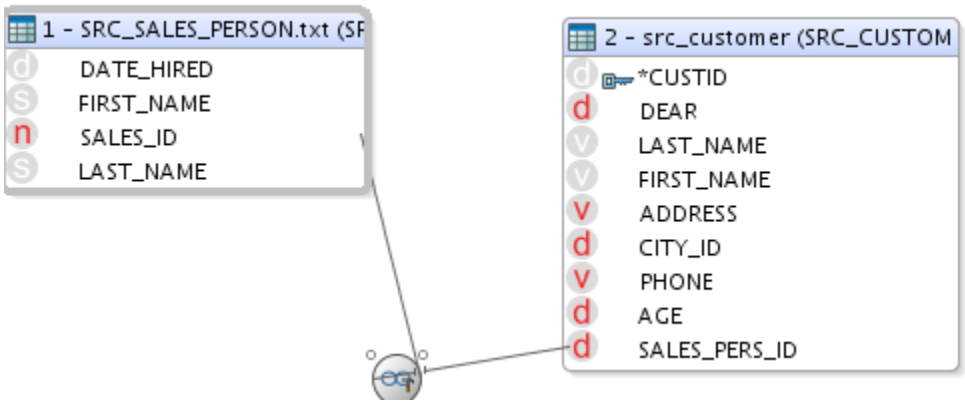


e) In the Design Navigator Models tab, expand the MYSQL Sales Data Source model and drag the SRC_CUSTOMER datastore to the Sources zone of your diagram. Click Yes to perform Automatic mapping. Click Arrange button. If necessary, rearrange the datastores to have the diagram as follows:

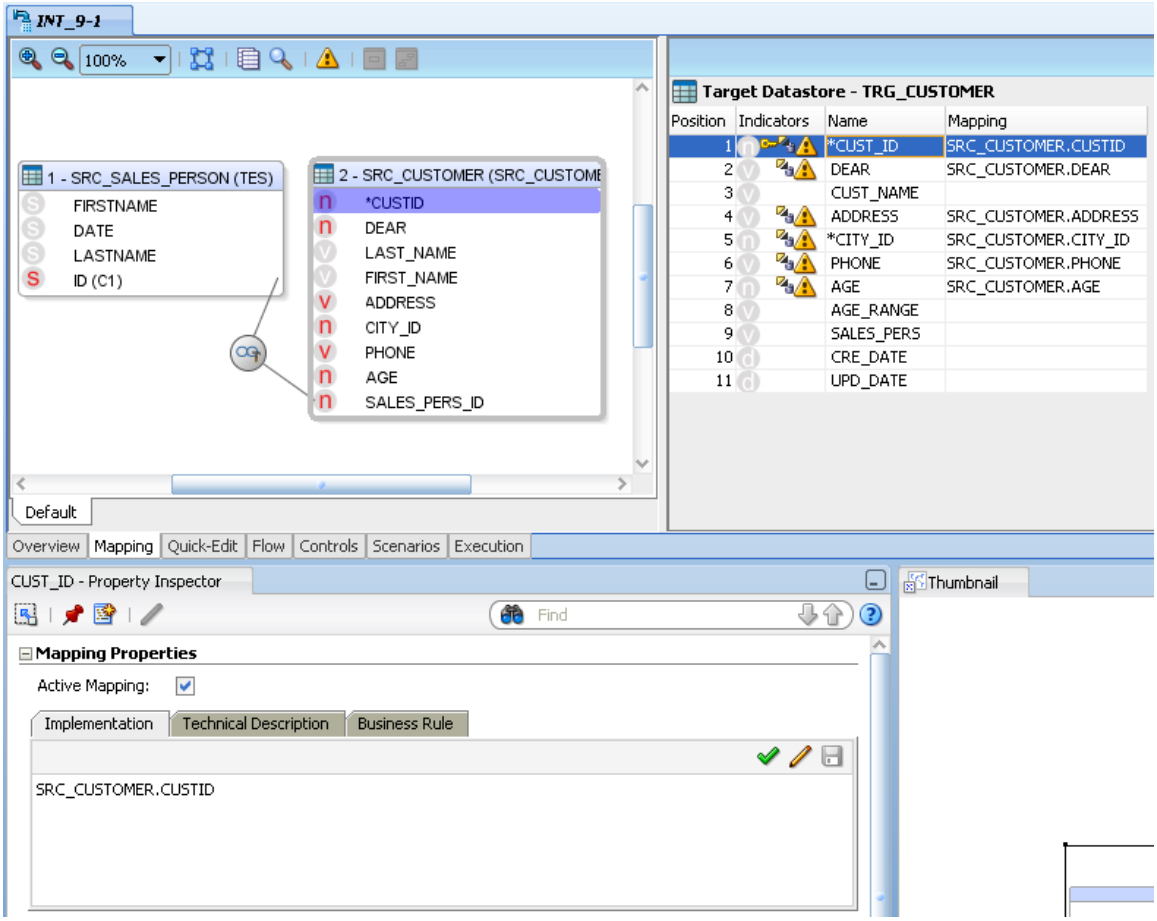




f) Drag the SALES_PERS_ID column from the SRC_CUSTOMER source datastore on to the SALES_ID column of the SRC_SALES_PERSON datastore. A join appears between these two sources.

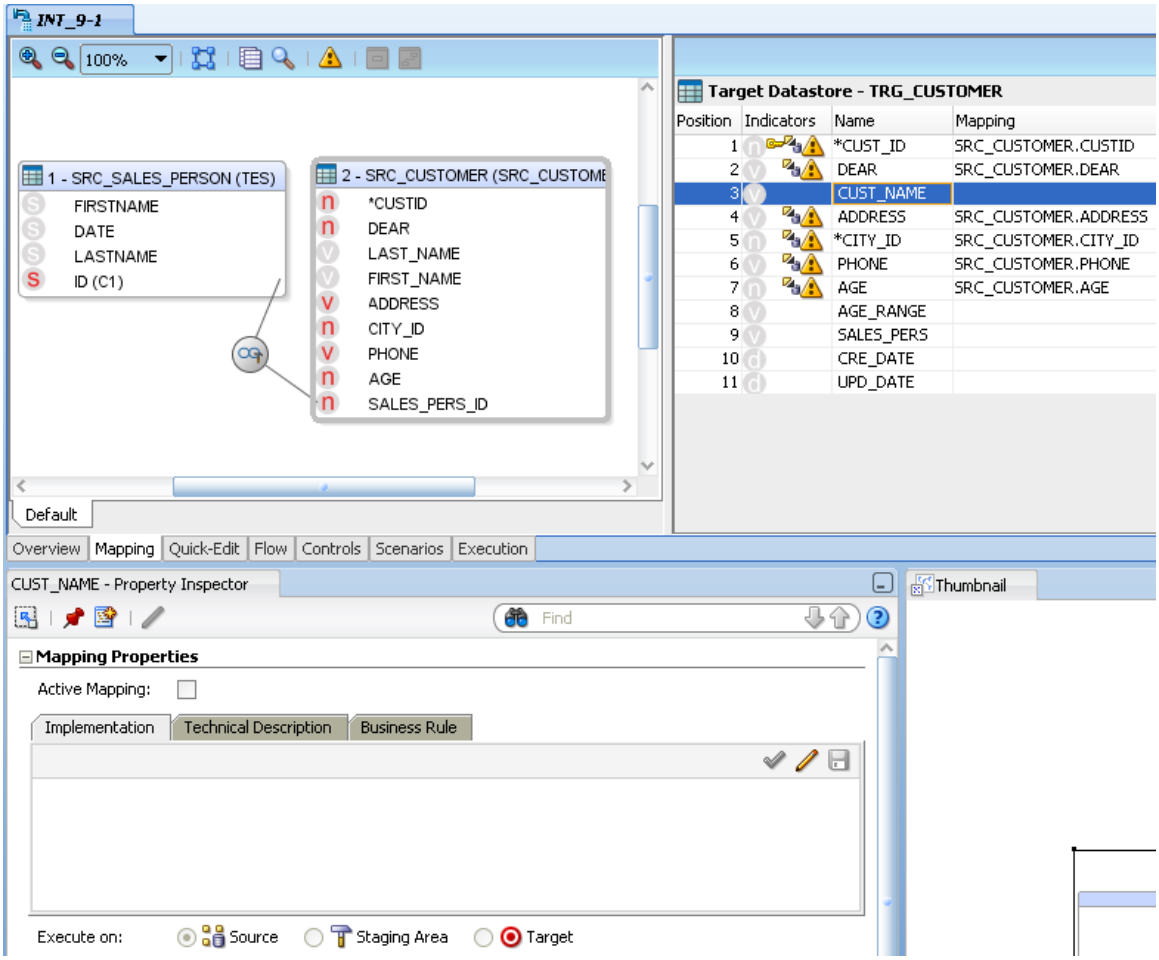


g) Select and drag the CUSTID column from the SRC_CUSTOMER source datastore to the CUST_ID column in the TRG_CUSTOMER target datastore. Select the CUST_ID column in the Target Datastore zone. The Mapping Properties panel shows the mapping.



Note: Ensure that the Active Mapping check box is selected for the CUST_ID column of the target datastore.

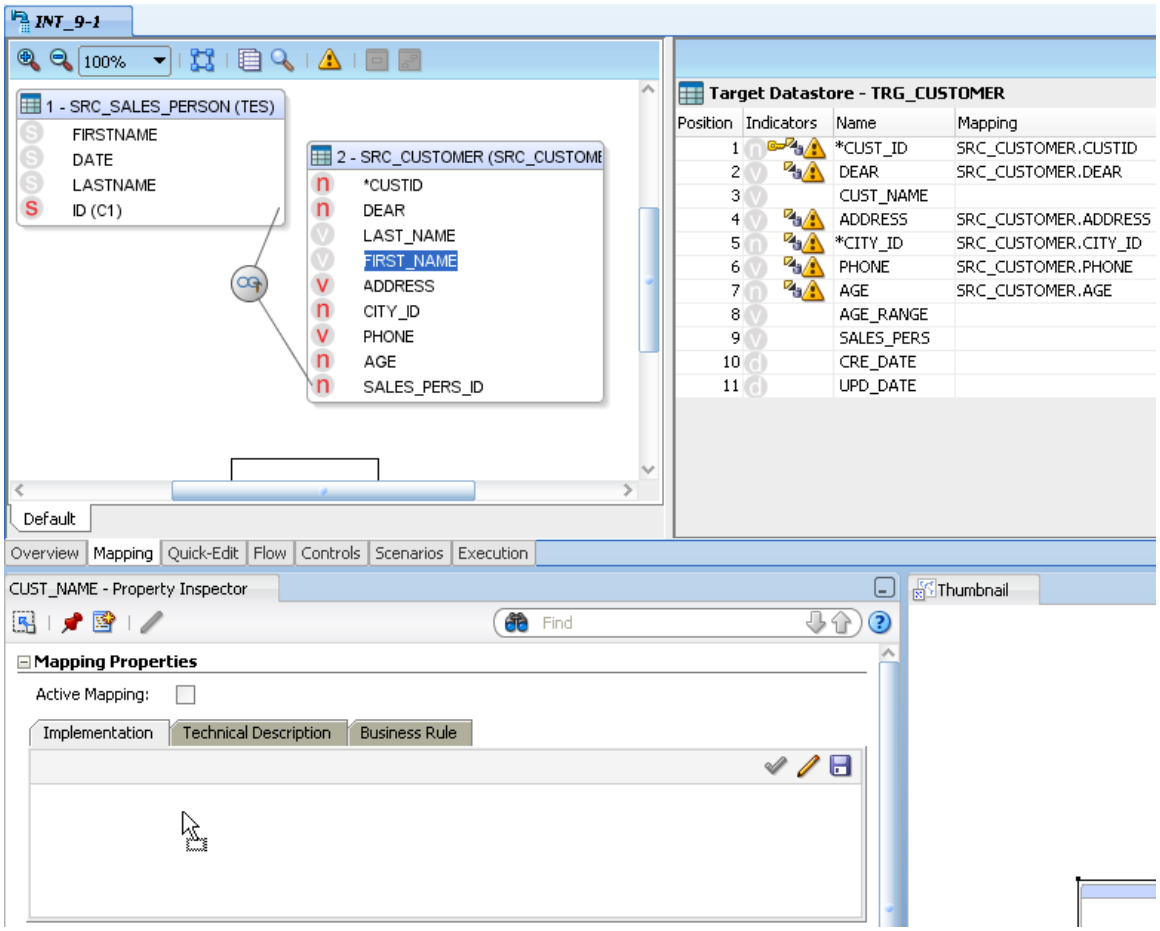
h) Select the CUST_NAME column in the Target Datastore zone. The Mapping Properties panel changes to show an empty mapping.

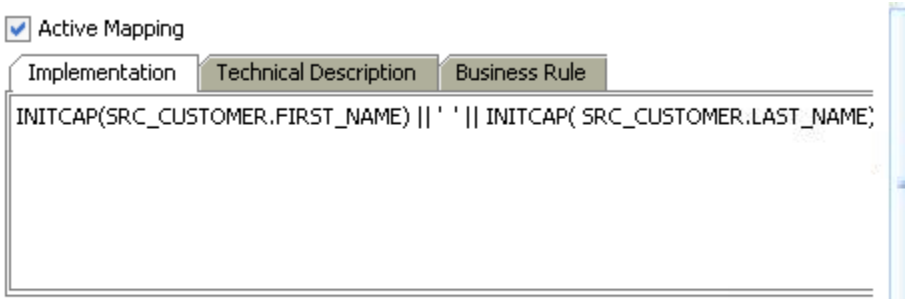


i) Drag the FIRST_NAME and LAST_NAME columns from the SRC_CUSTOMER source into the Mapping: CUST_NAME Implementation Tab field, and then edit the mapping to have the following mapping expression:

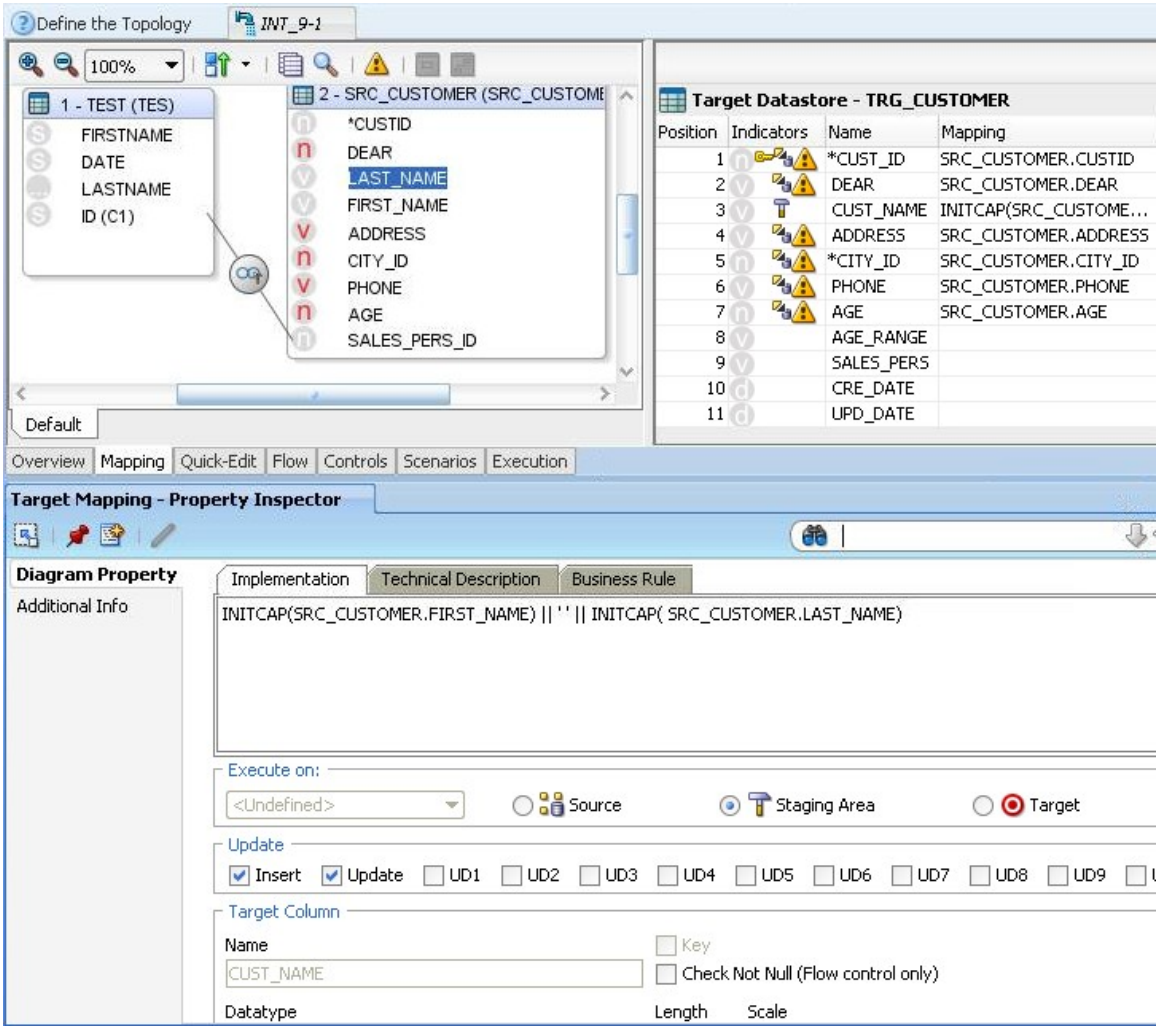
```
INITCAP(SRC_CUSTOMER.FIRST_NAME) || ' ' ||
INITCAP(SRC_CUSTOMER.LAST_NAME)
```

Note: Ensure that the *Active Mapping* check box is selected for the CUST_NAME column of the target data store.

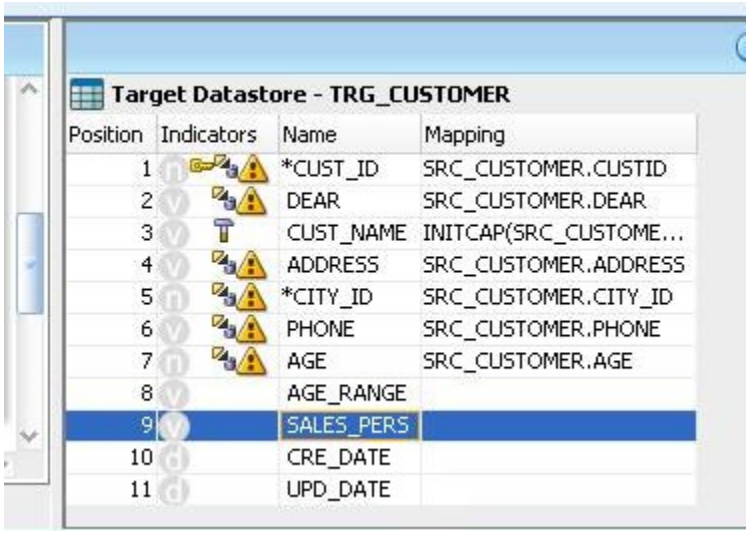

INT_9-1
100%
1 - SRC_SALES_PERSON (TES)
FIRSTNAME
DATE
LASTNAME
ID (C1)
2 - SRC_CUSTOMER (SRC_CUSTOME
*CUSTID
DEAR
LAST_NAME
FIRST_NAME
ADDRESS
CITY_ID
PHONE
AGE
SALES_PERS_ID
Target Datastore - TRG_CUSTOMER
Position
Indicators
Name
Mapping
1 *CUST_ID SRC_CUSTOMER.CUSTID
2 DEAR SRC_CUSTOMER.DEAR
3 CUST_NAME
4 ADDRESS SRC_CUSTOMER.ADDRESS
5 *CITY_ID SRC_CUSTOMER.CITY_ID
6 PHONE SRC_CUSTOMER.PHONE
7 AGE SRC_CUSTOMER.AGE
8 AGE_RANGE
9 SALES_PERS
10 CRE_DATE
11 UPD_DATE
Default
Overview
Mapping
Quick-Edit
Flow
Controls
Scenarios
Execution
CUST_NAME - Property Inspector
Find
Thumbnail
Mapping Properties
Active Mapping:
Implementation
Technical Description
Business Rule

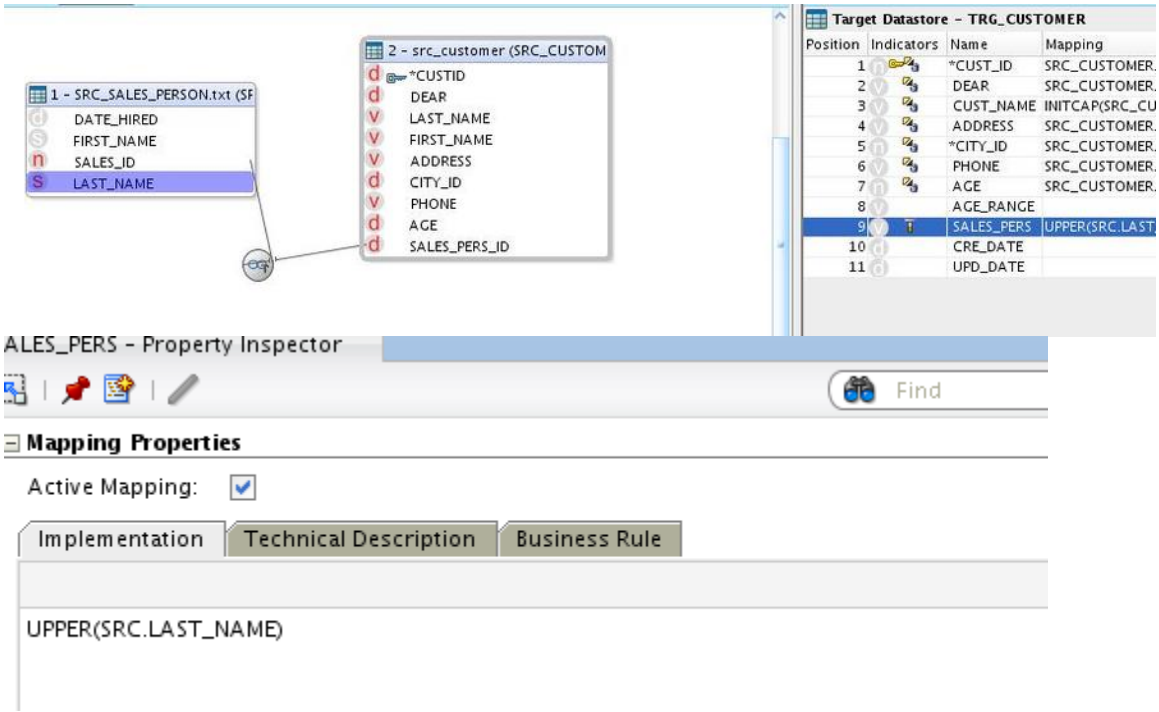

Active Mapping
Implementation
Technical Description
Business Rule
INITCAP(SRC_CUSTOMER.FIRST_NAME) || ' ' || INITCAP(SRC_CUSTOMER.LAST_NAME)

If the Thumbnail window is open, close it to extend the Mapping panel. Scroll down to select the Staging Area option for the Execute on panel.

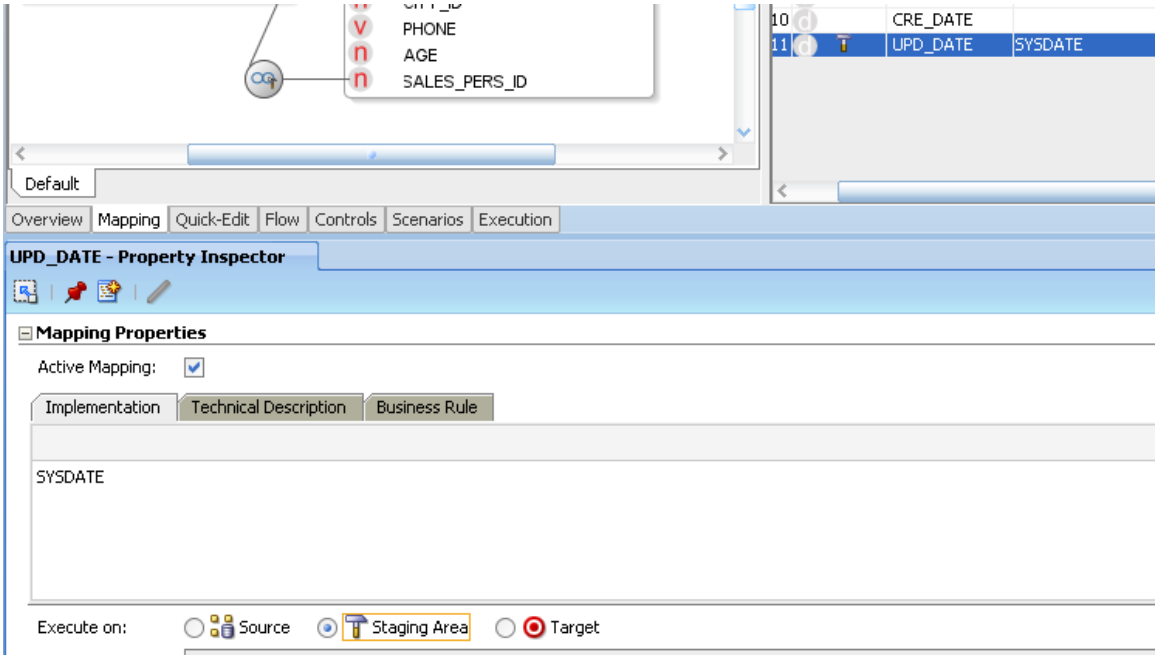


j) Drag the LAST_NAME column from the SRC_SALES_PERSON source datastore to the SALES_PERS column in the target datastore. Click the SALES_PERS column in the target datastore, and then edit the mapping to have the following mapping expression: UPPER(SRC.LAST_NAME). Select the Staging Area option from the Execute on panel.

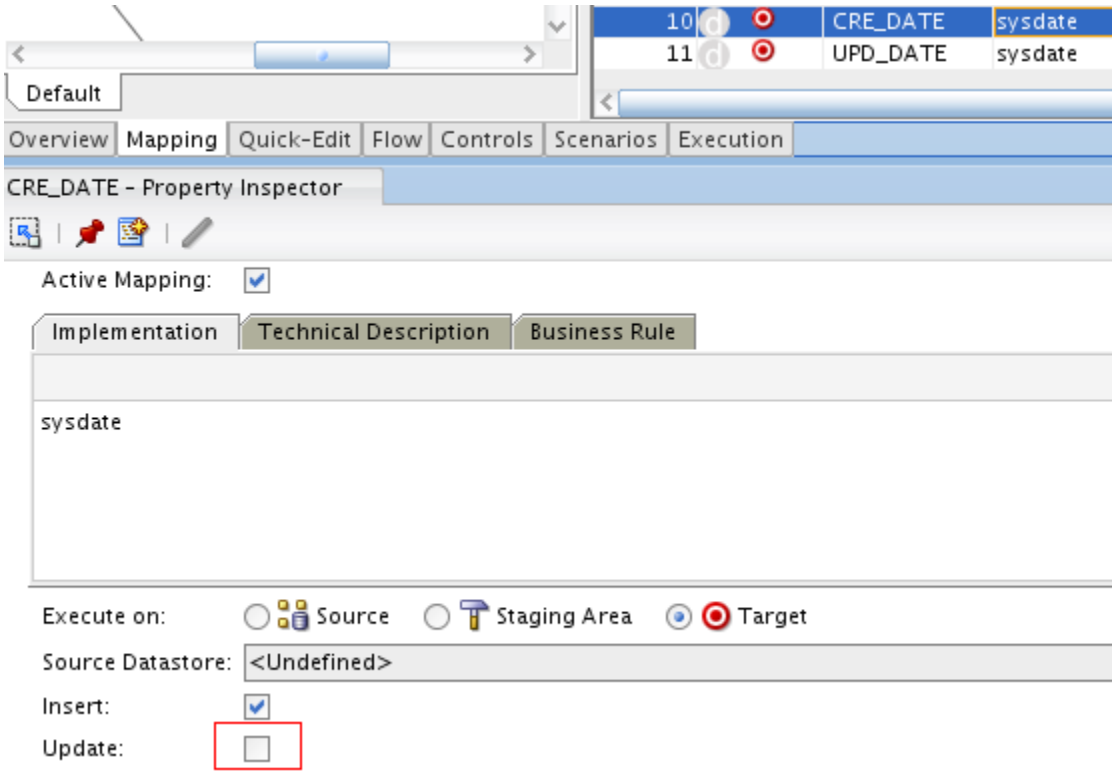




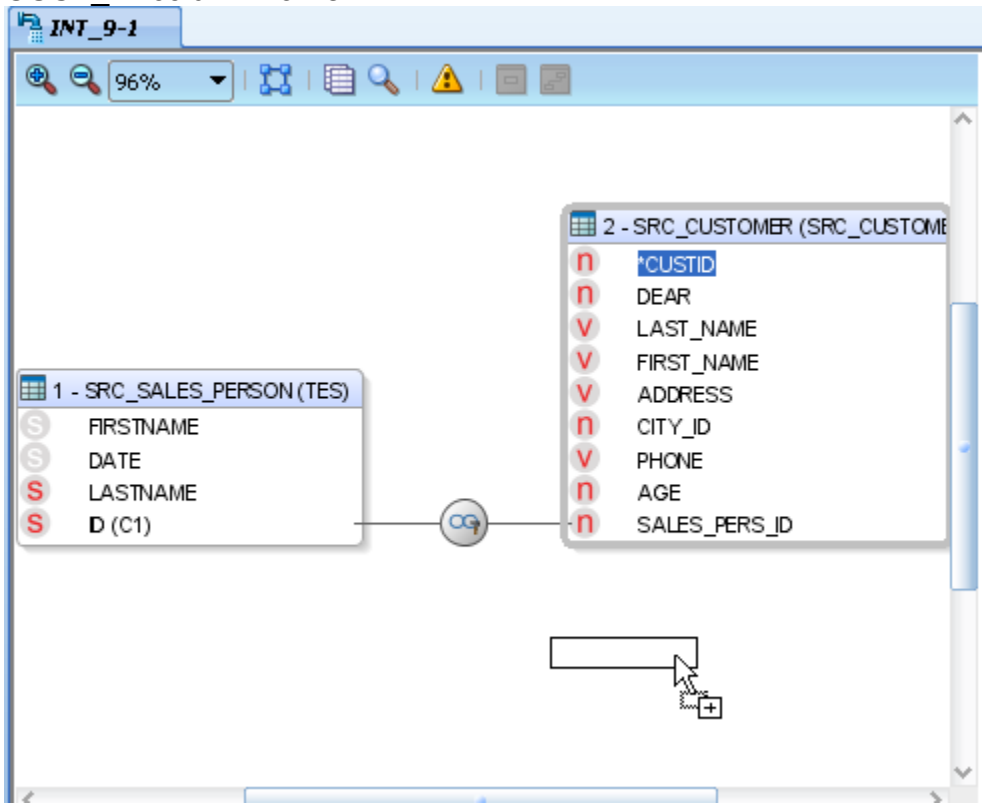
k) Select the UPD_DATE column in the Target Datastore zone and enter SYSDATE in the Mapping implementation field. Select the Staging Area option from the Execute on panel.
Note: Ensure that the *Active Mapping* check box is selected for the UPD_DATE column of the target data store.



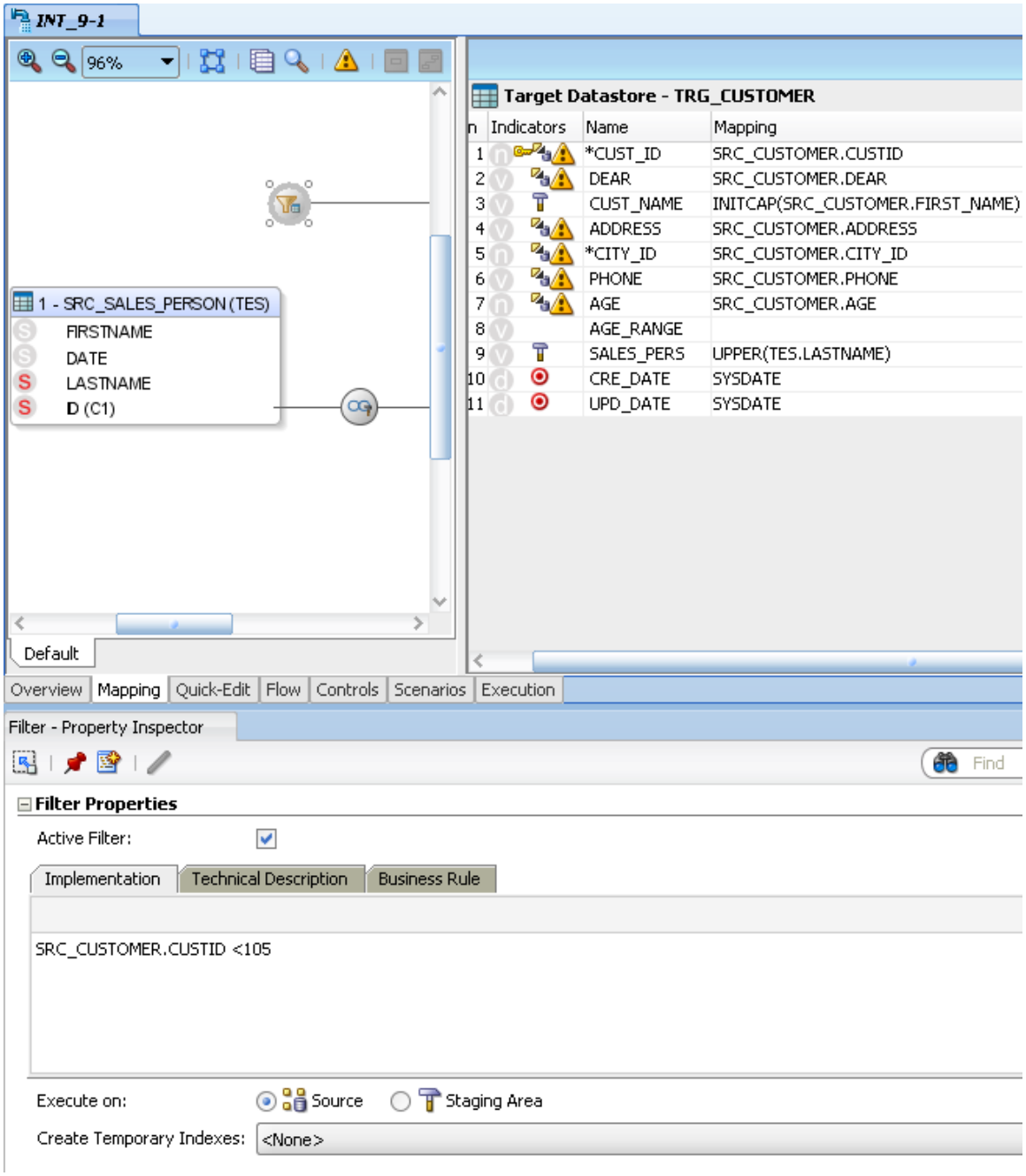
l) Do the same for the CRE_DATE column. Since the value of CRE_DATE column should not be changed later, *deselect* the **Update** check box. Make sure the **Target** option is selected from the Execute on panel.



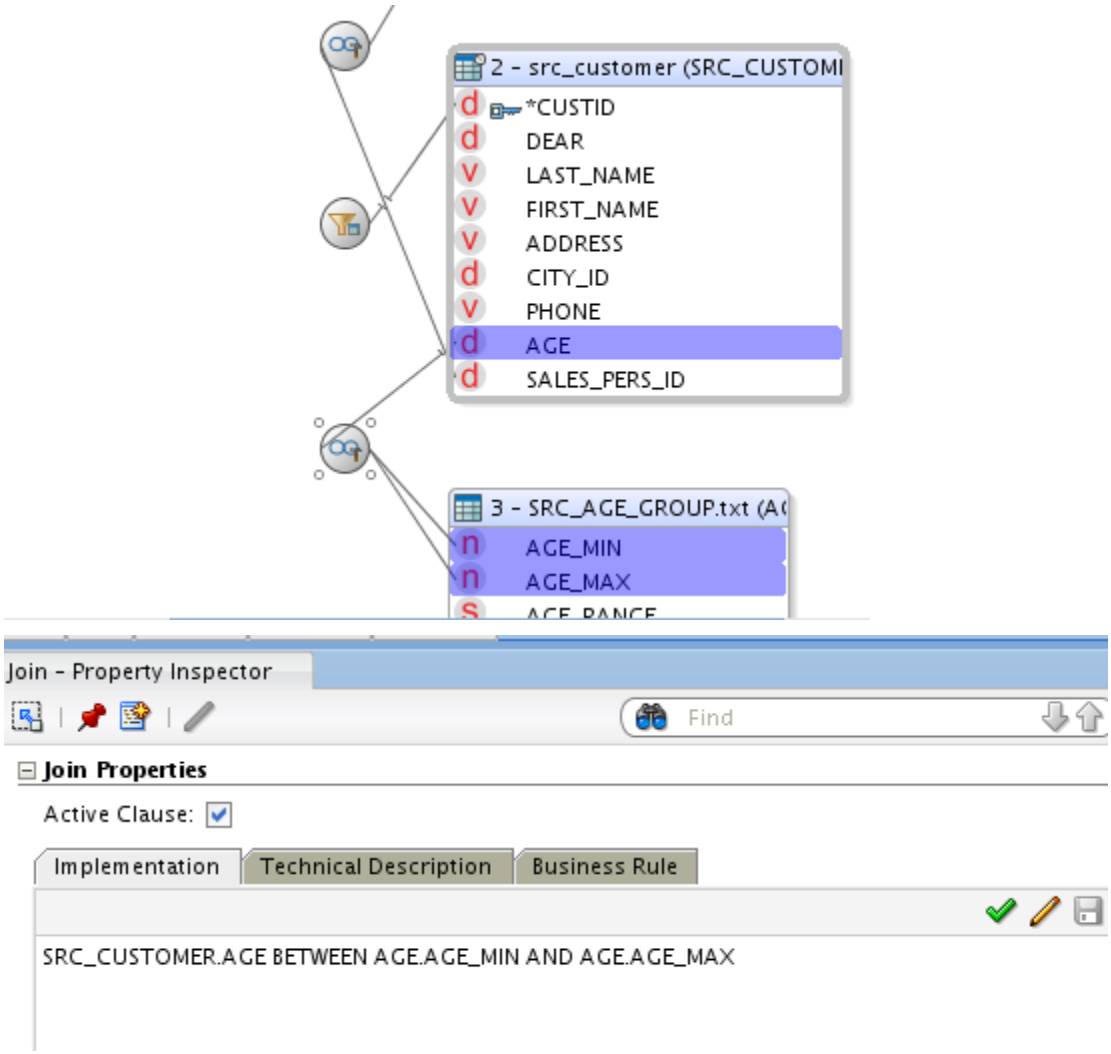
m) In the diagram, drag the CUSTID column from the SRC_CUSTOMER source to the workbench (the gray background). A filter appears with the CUST_ID column name.



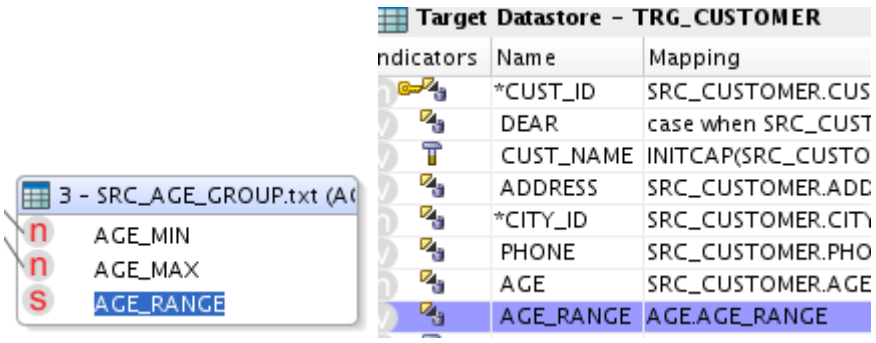
n) Edit the filter expression to have SRC_CUSTOMER.CUSTID < 105. Scroll down and make sure that the Source option from the Execute on panel is selected.



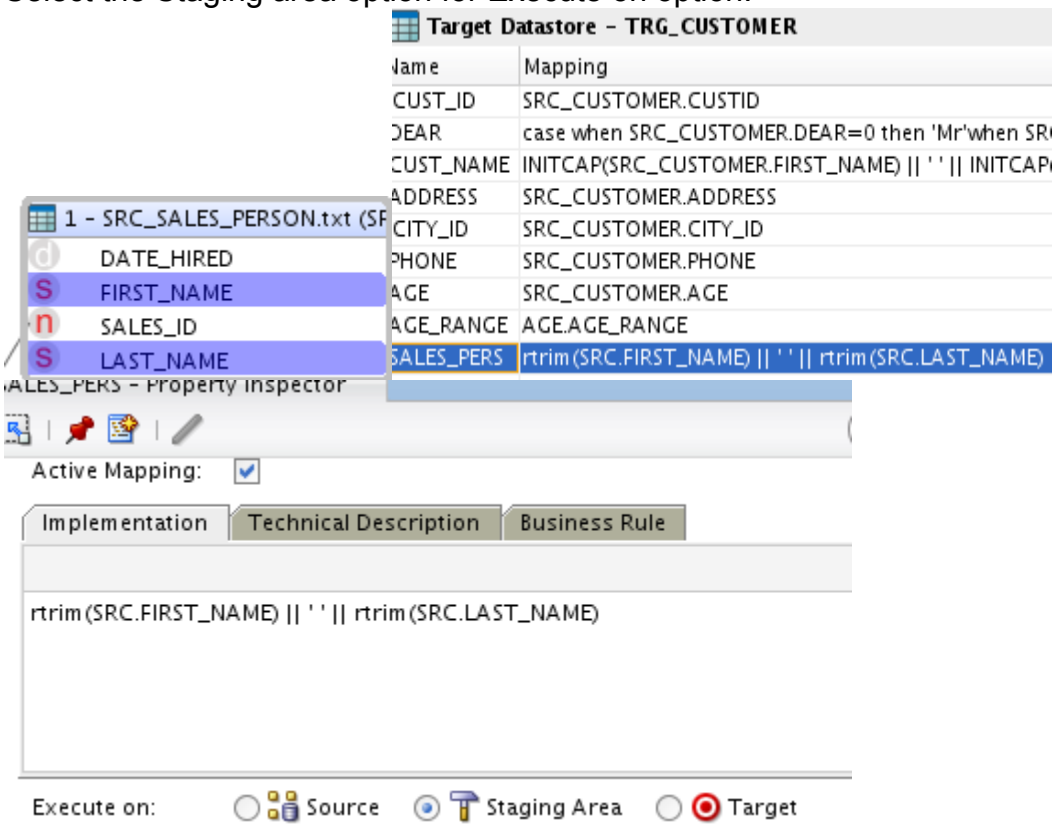
o) In the Design Navigator Models tab, expand the Flat Files Sources model. Drag the SRC_AGE_GROUP.txt datastore to the Sources zone of your diagram. Join SRC_CUSTOMER with SRC_AGE_GROUP.txt with the AGE between the AGE_MIN and the AGE_MAX.



p) Drag the AGE_RANGE from source SRC_AGE_GROUP.txt and drop it on the AGE_RANGE field of target TRG_CUSTOMER.



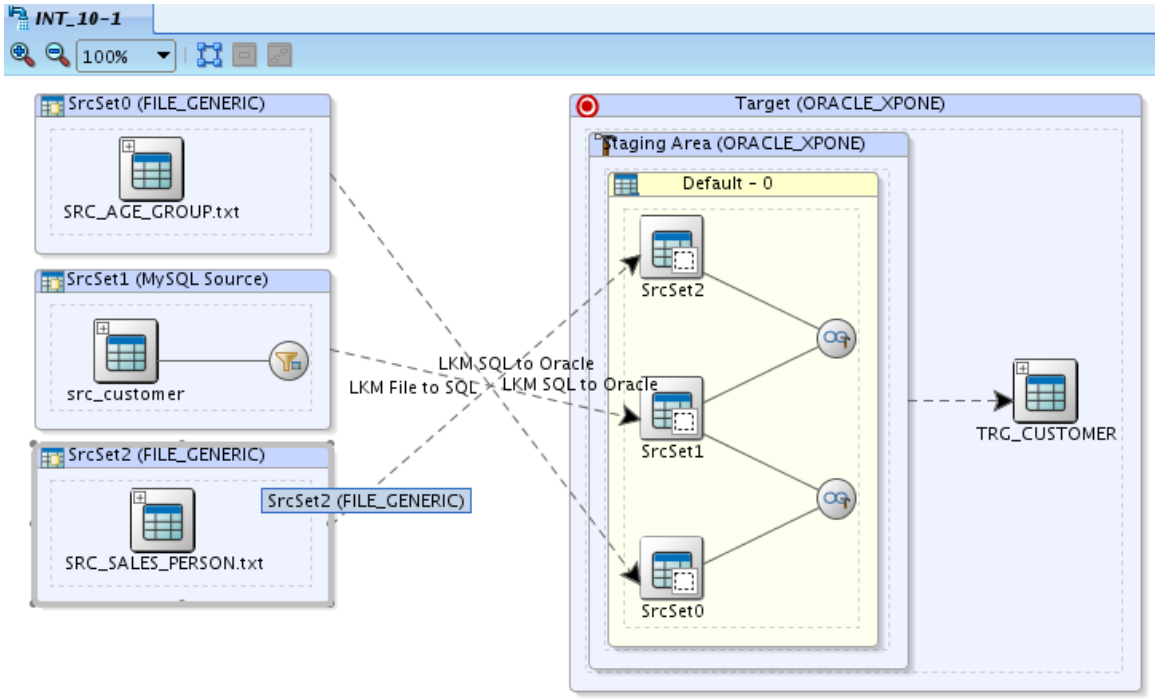
q) Modify the SALES_PERS of the target data store, Drag the FIRST_NAME and LAST_NAME field of source SRC_SALES_PERSON.txt and drop it on the property window of the SALES_PERS target field and modify the expression to rtrim(SRC.FIRST_NAME) || ' ' || rtrim(SRC.LAST_NAME). Select the Staging area option for Execute on option.

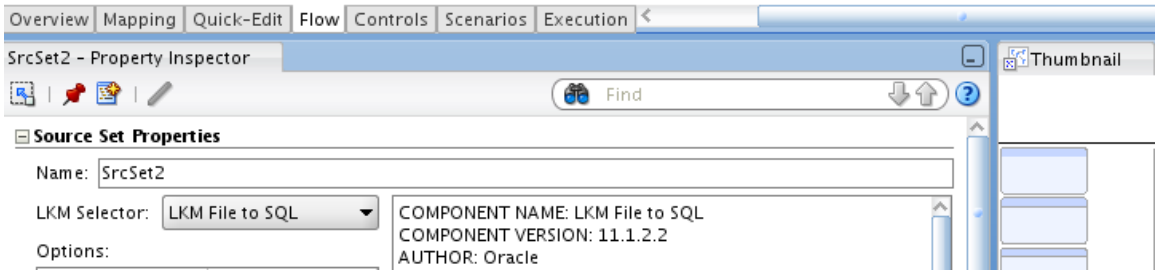


r) Similar to Lab 3, transform the DEAR of the target data store as follows:

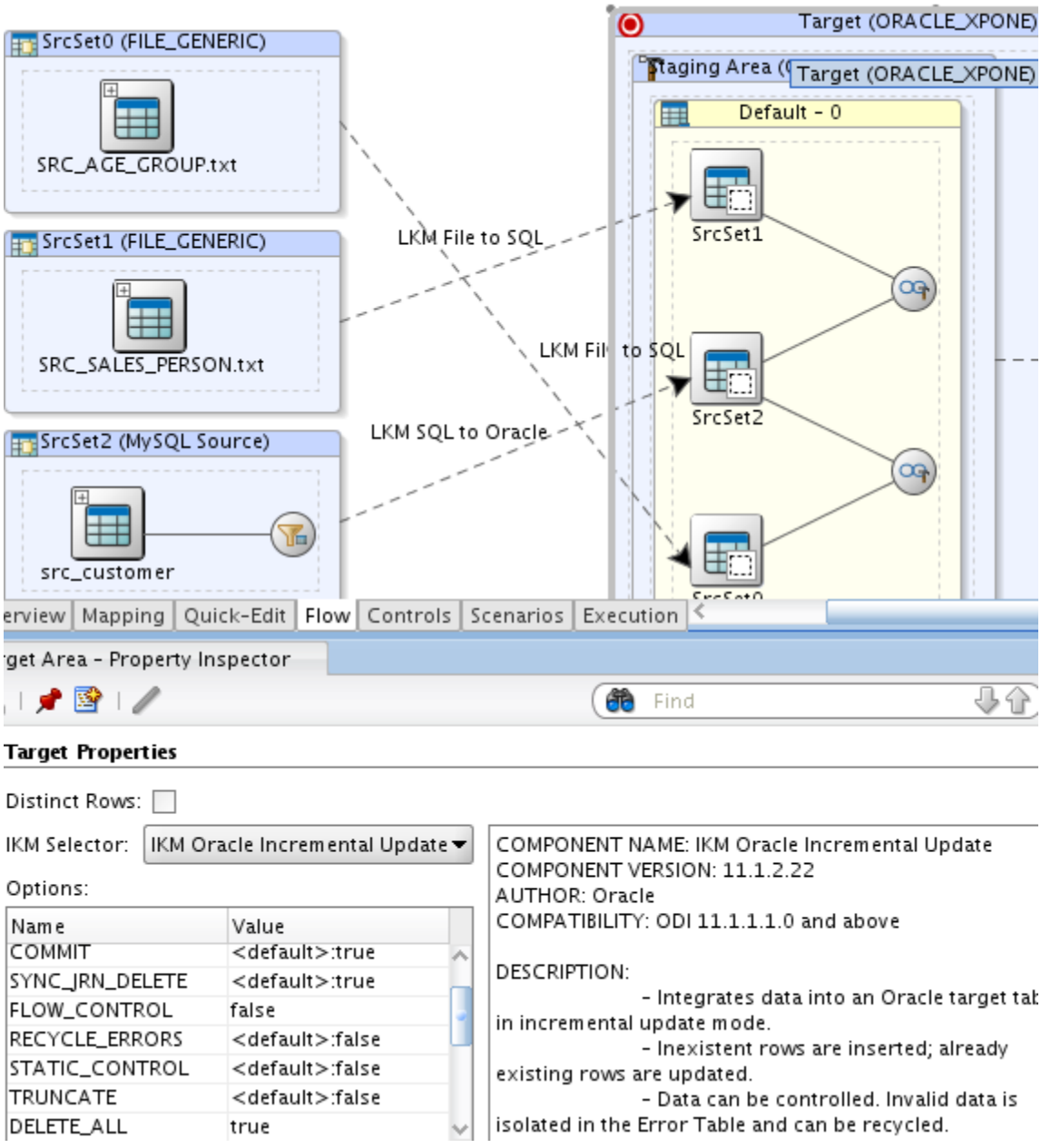
MySQL server column	Oracle Column	Transformation	SQL Syntax
Dear	Dear	Change 0 into Mr Change 1 into Mrs Change 2 into Ms	Case when <expression> then <value> when <expression> then <value> else <value> End

s) Click the Flow tab. Click SrcSet0 (FILE_GENERIC). In the Source Set Properties, select LKM File to SQL. Repeat the same for SrcSet2 (FILE_GENERIC).





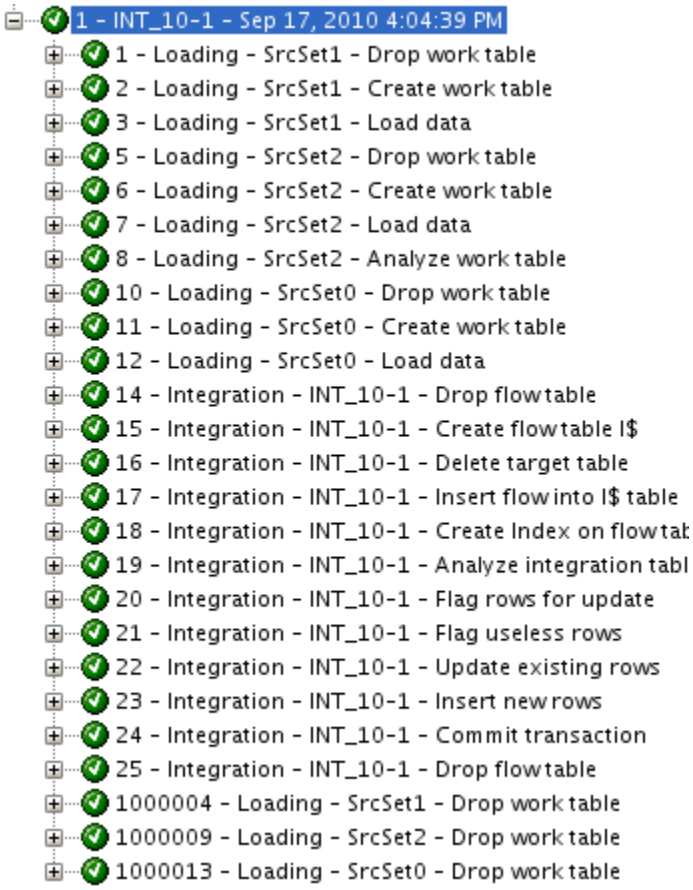
t) Click Target (ORACLE_XPONE) , Change the value of the FLOW_CONTROL to **false** and DELETE_ALL to **true** for the IKM Oracle Incremental update. Click Save button to save the interface.



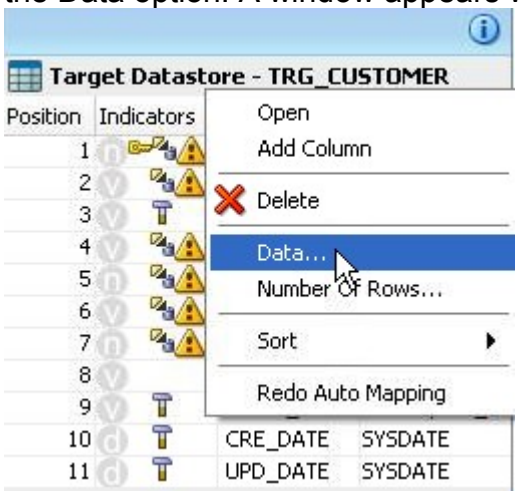
2) Run this interface, and check the content of the TRG_CUSTOMER table.

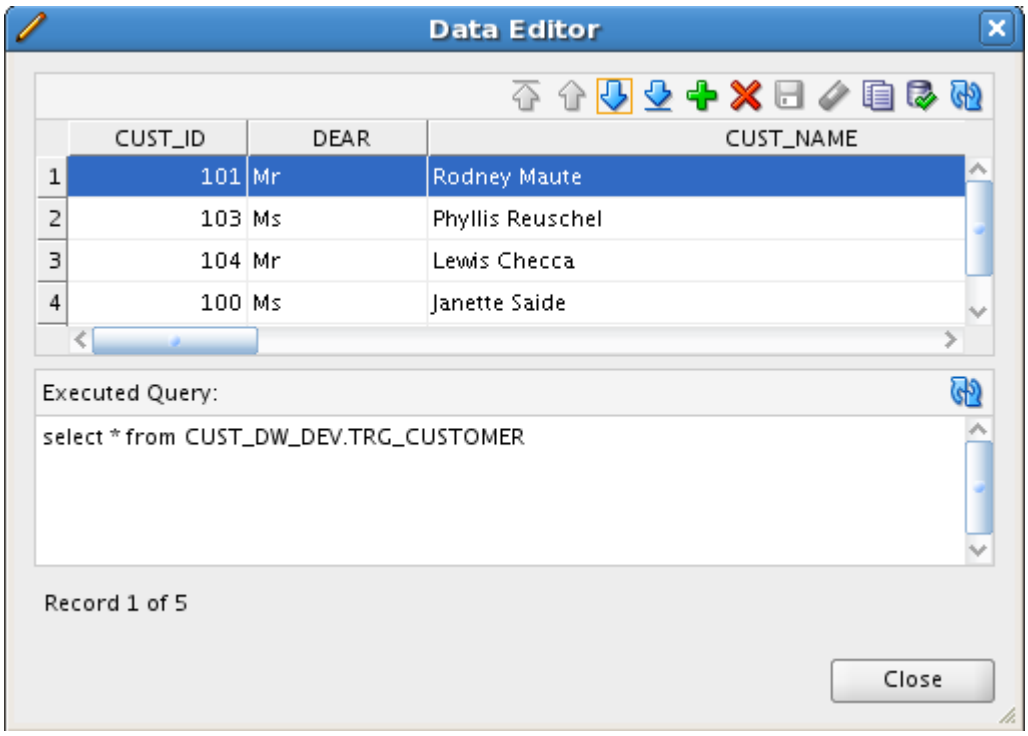
a) In the Projects tab, select interface INT_10-1. Click the Execute button .

b) Click OK in the Execution window that appears, and then click OK when the Session Started message appears. Open Operator, and verify that your Interface executed successfully.
Note: In ODI Operator Navigator, you may need to click the Refresh icon  .


1 - INT_10-1 - Sep 17, 2010 4:04:39 PM
1 - Loading - SrcSet1 - Drop work table
2 - Loading - SrcSet1 - Create work table
3 - Loading - SrcSet1 - Load data
5 - Loading - SrcSet2 - Drop work table
6 - Loading - SrcSet2 - Create work table
7 - Loading - SrcSet2 - Load data
8 - Loading - SrcSet2 - Analyze work table
10 - Loading - SrcSet0 - Drop work table
11 - Loading - SrcSet0 - Create work table
12 - Loading - SrcSet0 - Load data
14 - Integration - INT_10-1 - Drop flow table
15 - Integration - INT_10-1 - Create flow table I$
16 - Integration - INT_10-1 - Delete target table
17 - Integration - INT_10-1 - Insert flow into I$ table
18 - Integration - INT_10-1 - Create Index on flow tab
19 - Integration - INT_10-1 - Analyze integration tabl
20 - Integration - INT_10-1 - Flag rows for update
21 - Integration - INT_10-1 - Flag useless rows
22 - Integration - INT_10-1 - Update existing rows
23 - Integration - INT_10-1 - Insert new rows
24 - Integration - INT_10-1 - Commit transaction
25 - Integration - INT_10-1 - Drop flow table
1000004 - Loading - SrcSet1 - Drop work table
1000009 - Loading - SrcSet2 - Drop work table
1000013 - Loading - SrcSet0 - Drop work table

c) Return to Designer, click the Mapping tab, select the TRG_CUSTOMER target datastore (click the name of the datastore). Right-click and select the Data option. A window appears with the loaded data.





3) Close this window, and then close your interface.

Lab 11: Advanced Interface – Using Datasets with ODI Interface

Introduction

A **dataset** represents the data flow coming from a group of datastores. Several datasets can be merged into the interface target datastore using set-based operators such as Union and Intersect. The support for datasets as well as the set-based operators supported depends on the capabilities of the staging area's technology.

You can add, remove, and order the datasets of an interface and define the operators between them in the DataSets Configuration dialog. Note that the set-based operators are always executed on the staging area.

In previous labs, you learned how to create an interface and execute it by an agent. Oracle Data Integrator generates the code for the execution in the form of a *session*. The run-time agent processes this code and connects to the sources and targets to perform the data integration.

In Oracle Data Integrator you have the possibility at design-time to simulate an execution. Simulating an execution generates and displays the code corresponding to the execution without running this code. Execution **simulation** provides reports suitable for code review. Note: No session is created in the log when the execution is started in simulation mode

Process Overview

In this practice, you add a new dataset to an interface. You will add a bulk feed of customer data from another system with some filters by adding another dataset.

Now you create a new dataset, naming it BULK_CUST_DATA. For its source, you specify the ARCHIVE_CUST data store from the Oracle Sales Warehouse model.

You specify the UNION operator to unite this new source of data with the default dataset. Next, you perform execution **simulation** to preview the code that will be used for this new dataset with UNION operator.

Finally, you execute the interface and verify the rows inserted into the target table.

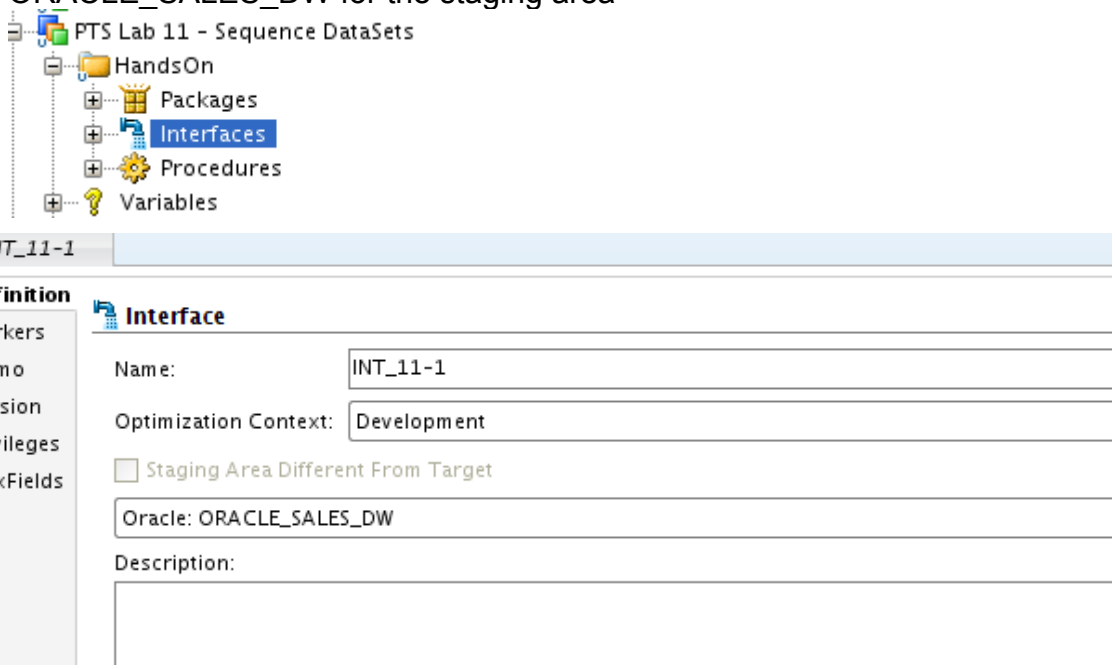
Scenario

You created interface to load data in the target model from different sources and perform data transformation, filtering, and provided a date when data was updated. Now you create an interface with multiple datasets to add in a bulk feed of customer data from another system.

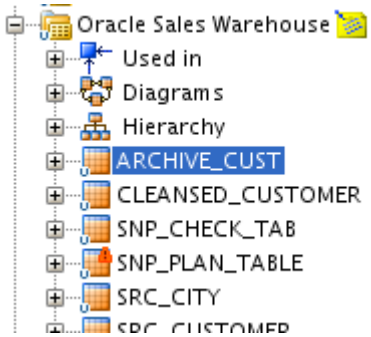
Instructions

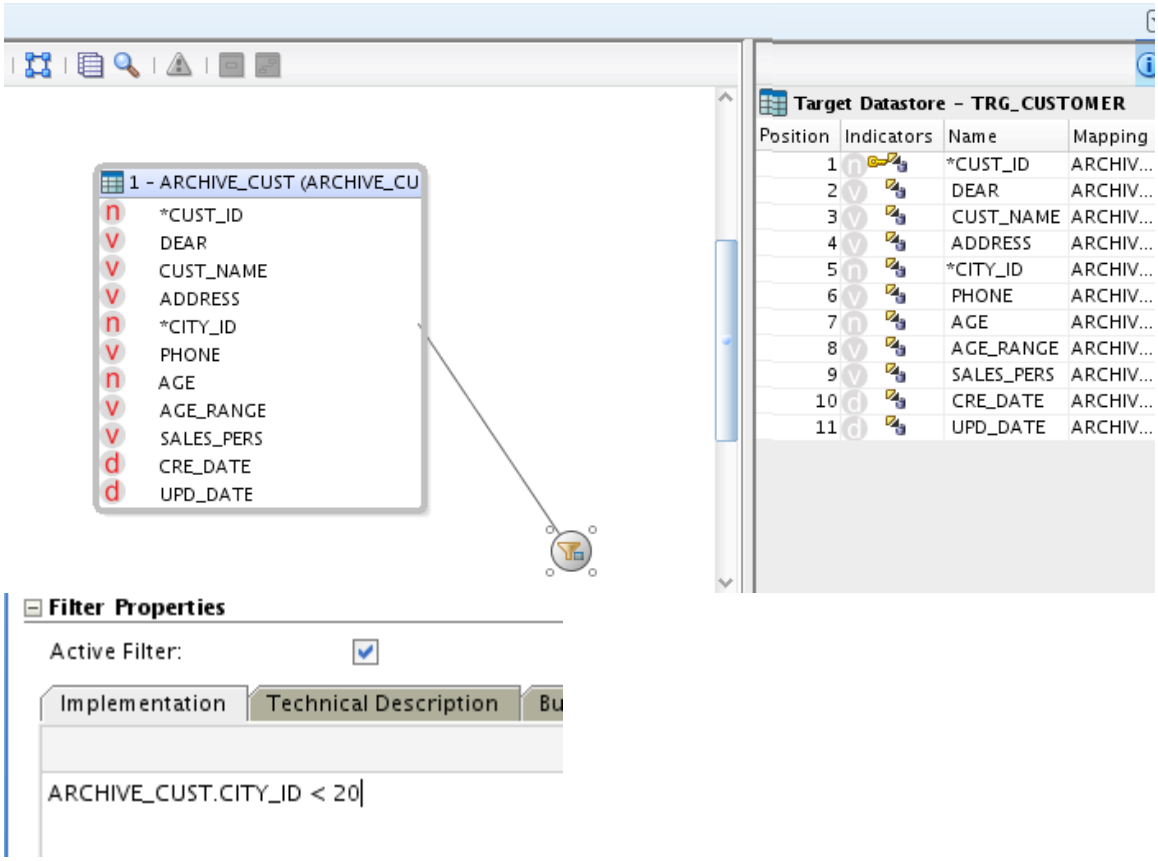
1) Create ODI interface with multiple datasets.

a) In the Designer, Expand the project PTS Lab 11 – Datasets. Right-click interface and create a new interface INT_11-1. Choose the Oracle: ORACLE_SALES_DW for the staging area

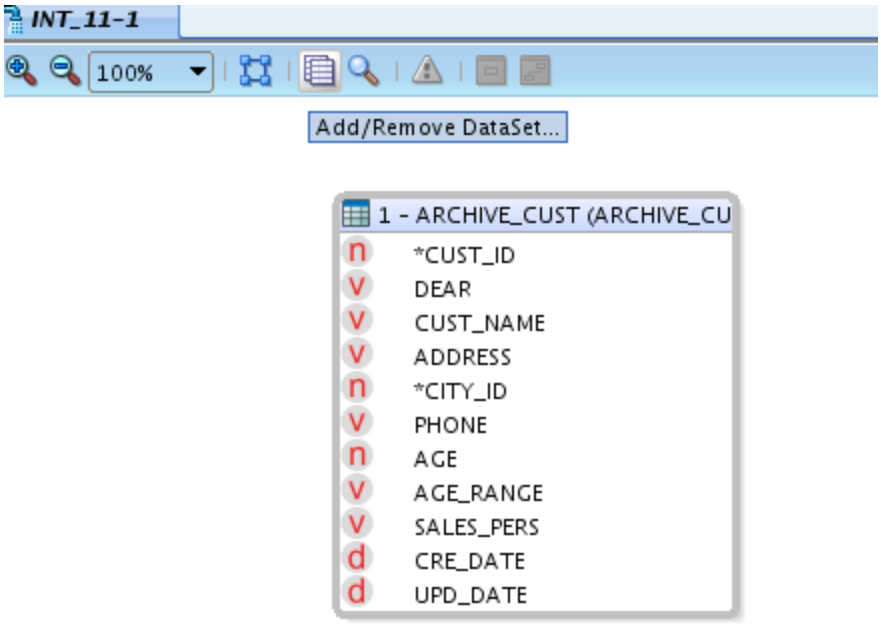


b) Click the Mapping tab of the Interface. Expand the Model Oracle Sales Warehouse from the Model Designer; Drag the table TRG_CUSTOMER on to the target area. Drag the table ARCHIVE_CUST on to the source area (If the table is not visible, right click the Model Oracle Sales Warehouse and select Reverse Engineer option. This will update model). Drag the CITY_ID field to the open area to add a filter and give the condition ARCHIVE_CUST.CITY_ID < 20

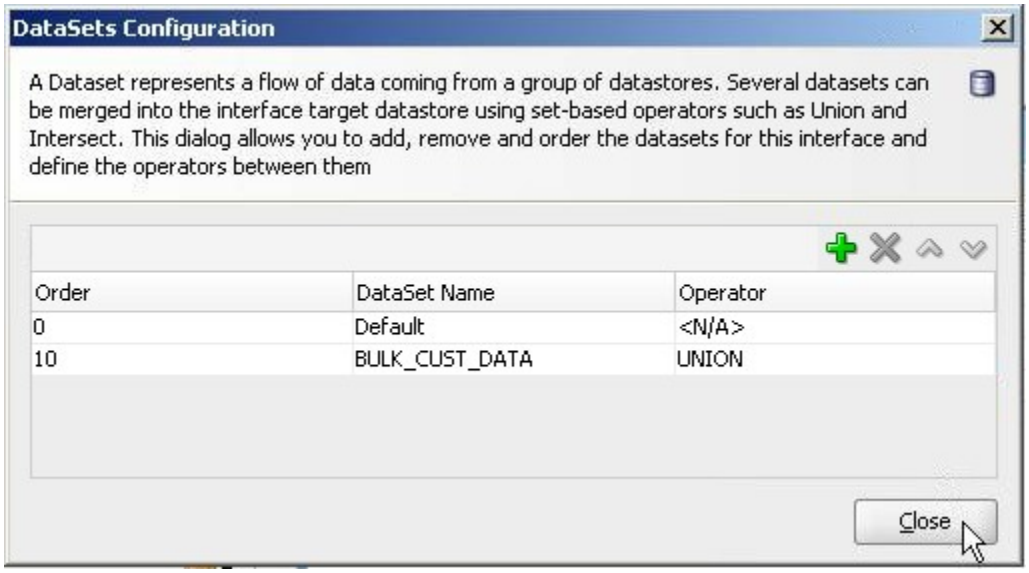




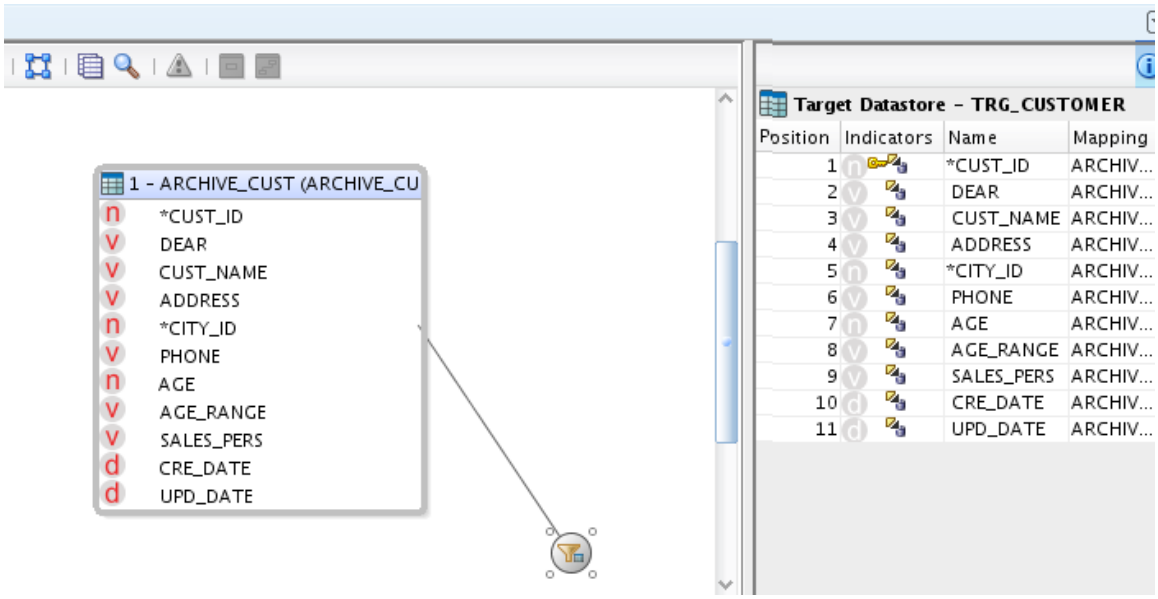
c) Add a new data set by selecting the data set icon as show in the below screen shot

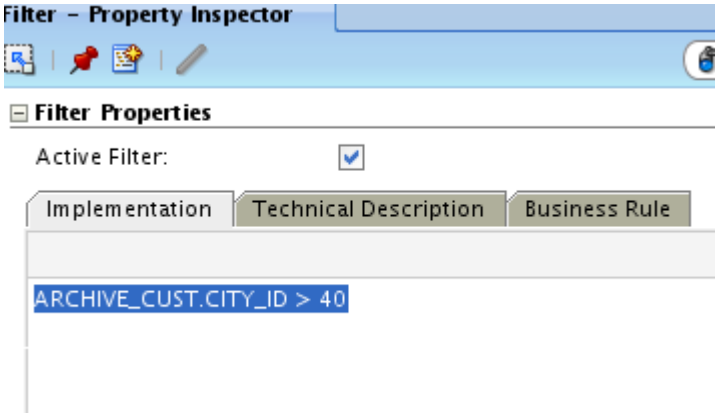


d) Enter new dataset name: BULK_CUST_DATA. Select Operator: UNION. Close DataSets Configuration window.

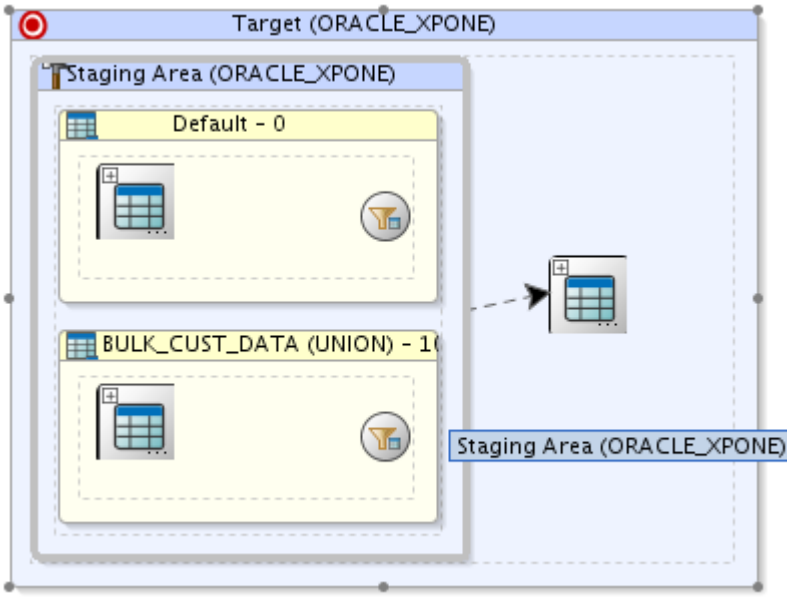


e) In the Mapping tab, select BULK_CUST_DATA dataset tab. In the Models tab, drag ARCHIVE_CUST data store from the Oracle Sales Warehouse to the Source area of the interface. Click Yes to perform automatic mapping. Drag the CITY_ID field to the open area to add a filter and give the condition ARCHIVE_CUST.CITY_ID > 40


1 - ARCHIVE_CUST (ARCHIVE_CU
*CUST_ID
DEAR
CUST_NAME
ADDRESS
*CITY_ID
PHONE
AGE
AGE_RANGE
SALES_PERS
CRE_DATE
UPD_DATE
Target Datastore - TRG_CUSTOMER
Position
Indicators
Name
Mapping
1 *CUST_ID ARCHIV...
2 DEAR ARCHIV...
3 CUST_NAME ARCHIV...
4 ADDRESS ARCHIV...
5 *CITY_ID ARCHIV...
6 PHONE ARCHIV...
7 AGE ARCHIV...
8 AGE_RANGE ARCHIV...
9 SALES_PERS ARCHIV...
10 CRE_DATE ARCHIV...
11 UPD_DATE ARCHIV...


Filter - Property Inspector
Filter Properties
Active Filter:
Implementation
Technical Description
Business Rule
ARCHIVE_CUST.CITY_ID > 40

f) Open Flow tab and verify the flow of your interface. Click the Target datastore. Select the IKM SQL Control Append , Set FLOW_CONTROL option to false and DELETE_ALL option to true. Save the Interface



Target Properties

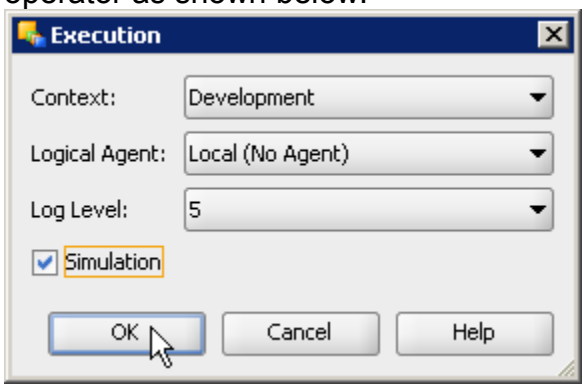
Distinct Rows: ☐

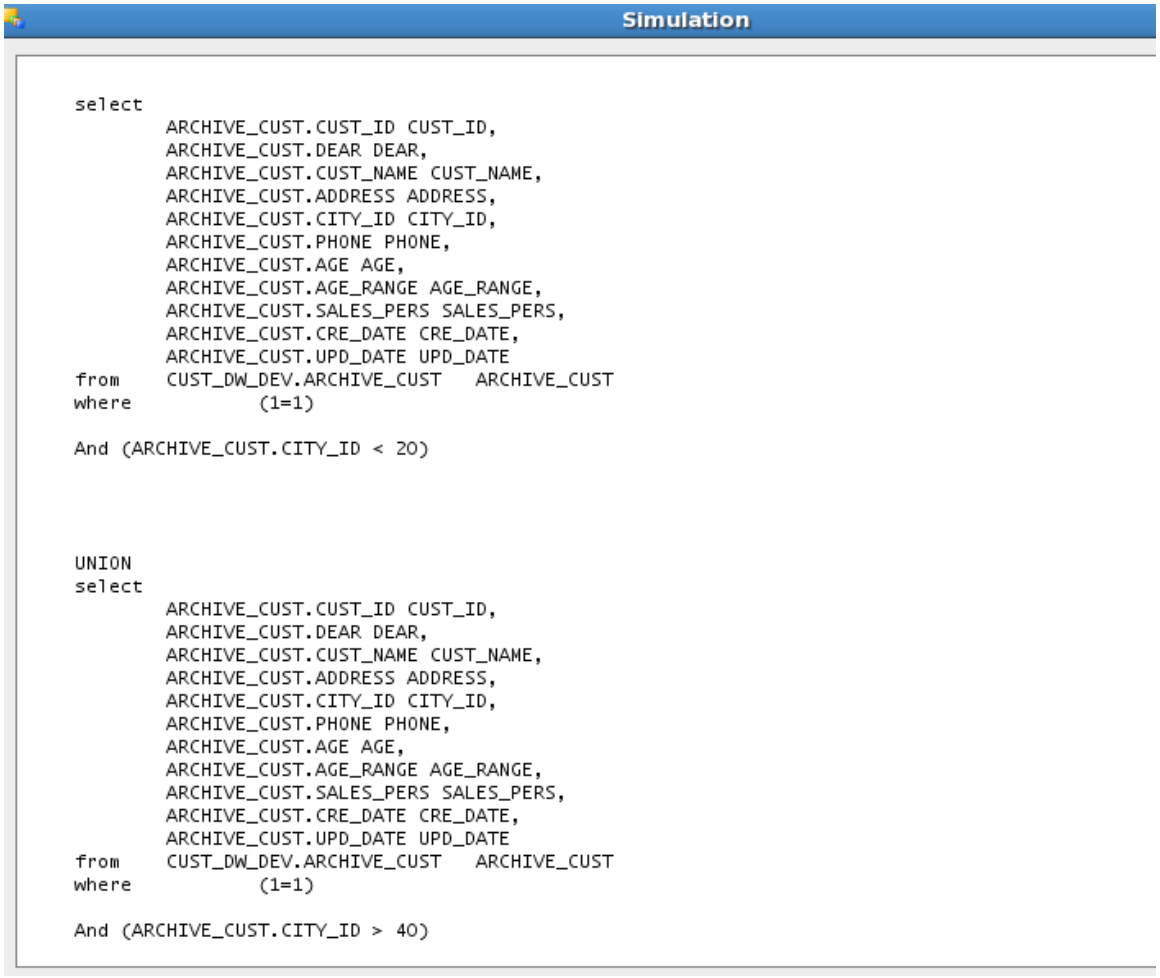
IKM Selector: IKM SQL Control Append

Options:

Name	Value
INSERT	<default>:true
COMMIT	<default>:true
FLOW_CONTROL	false
RECYCLE_ERRORS	<default>:false
STATIC_CONTROL	<default>:false
TRUNCATE	<default>:false
DELETE_ALL	true

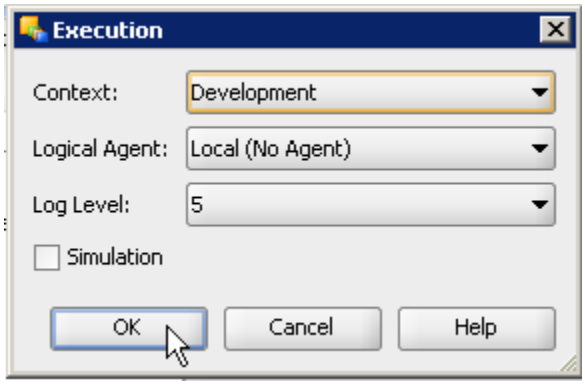
g) Perform execution simulation. In the Simulation window, scroll down and view simulated code for the dataset ARCHIVE_CUST with UNION operator as shown below.



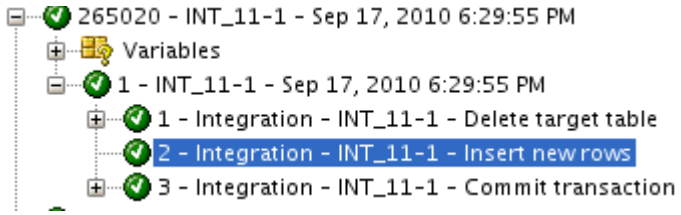


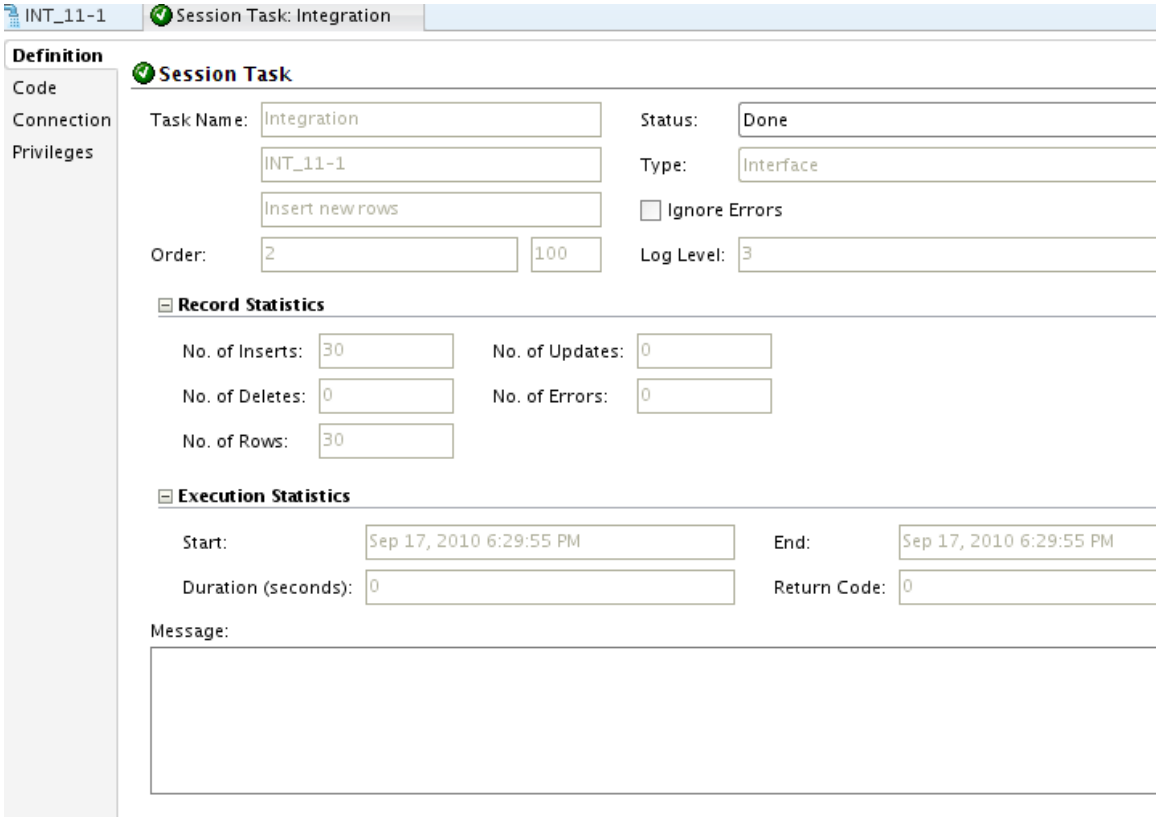
2) Execute interface INT_11-1 and verify the execution results.

a) Execute interface INT_11-1.



b) Open the Operator. Verify the session INT_11-1 executed successfully. Scroll down and open task “Integration – INT_11-1- Insert new rows”. Verify number of inserts in the target table.





Lab 12: Advanced Interface – Temporary Interface with Lookup

Introduction

The source datastores contain data used to load the target datastore. Two types of datastores can be used as an interface source: datastores from the models and temporary datastores that are the target of an interface.

Derived Select for Temporary Interfaces - When using a temporary datastore that is the target of another interface as a source or as a lookup table, you can choose not to persist the target of the temporary interface, and generate instead a Derived Select (sub-select) statement corresponding to the loading of the temporary datastore. Consequently, the temporary interface no longer needs to be executed to load the temporary datastore. The code generated for the sub-select is either a default generated code, or a customized syntax defined in an IKM. This feature eliminates the need for complex packages handling temporary interfaces and simplifies the execution of cascades of temporary interfaces.

Lookups - A lookup is a datastore (from a model or the target datastore of an interface) – called the lookup table - associated to a source datastore - the driving table - via a join expression and from which data can be fetched and used into mappings. Lookups are used to simplify the design and readability of interfaces and allow for optimized code for execution.

Process Overview

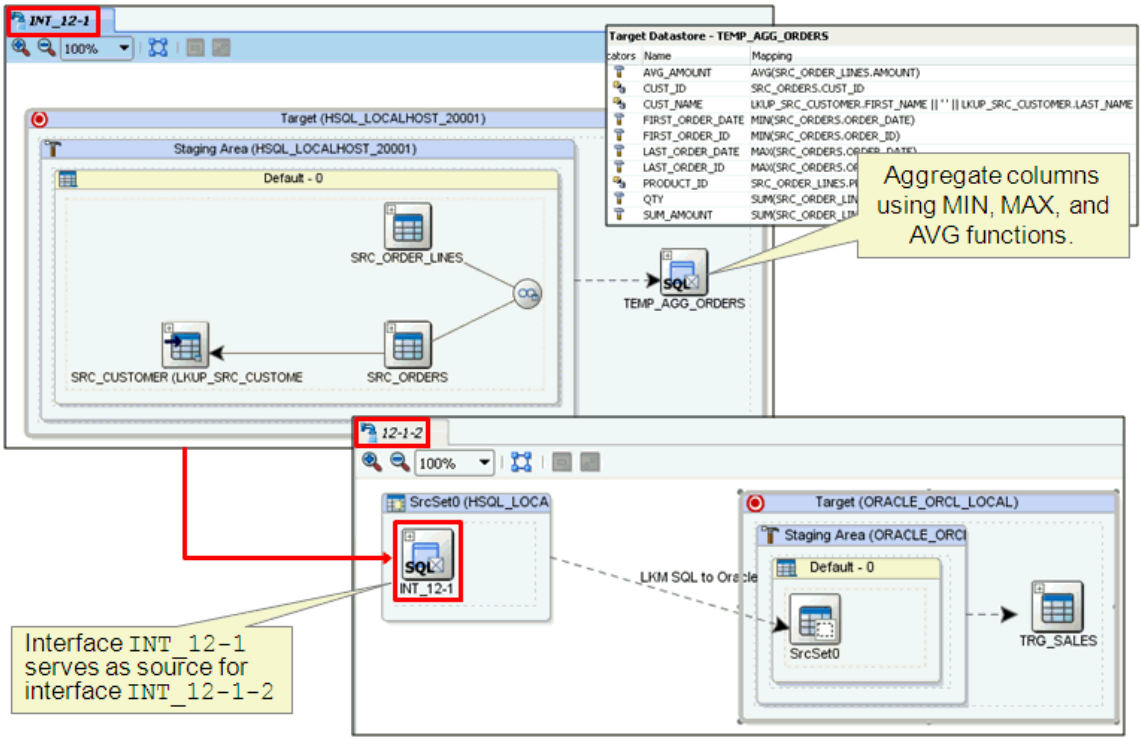
In this lab, you perform the following steps:

1) Create a temporary interface INT_12-1.
   a) Use datastores SRC_ORDERS and SRC_ORDER_LINES from the HSQL Source Data model, joined on ORDER_ID.
   b) Use SRC_CUSTOMER as a lookup table.

2) Create a temporary target table TEMP_AGG_ORDERS.
   a) Aggregate some of its columns using the MIN, MAX, and AVG functions.

3) Create interface INT_12-2.
   a) Use the temporary interface INT_12-1 as a source.
   b) Use datastore TRG_SALES as the target.

4) Execute INT_12-2 and examine the rows inserted into TRG_SALES.



Scenario

You created interfaces to load data in the target models from different sources and performed data transformation, filtering, and implemented a lookup to fetch additional information for the data loading in the target. You also created an interface with multiple datasets to add in a bulk feed of customer data from another system.

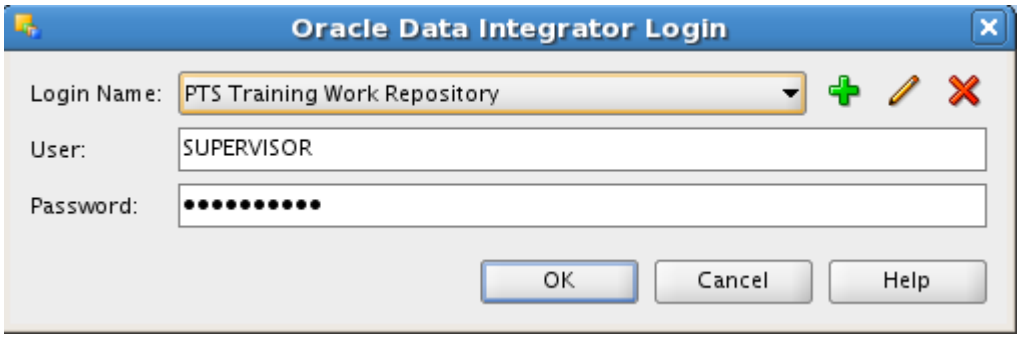
Now, you need to create a temporary interface, which is used for loading data to sales target datastore.

Instructions

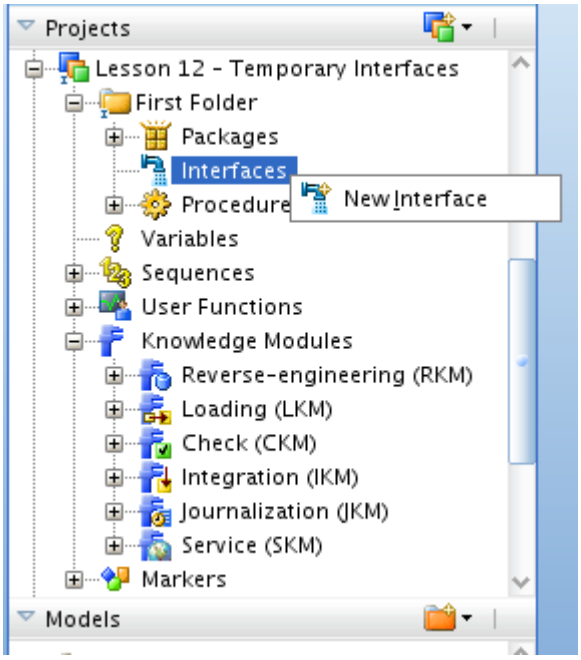
1) Start HSQL, on terminal window, type > startHSQL

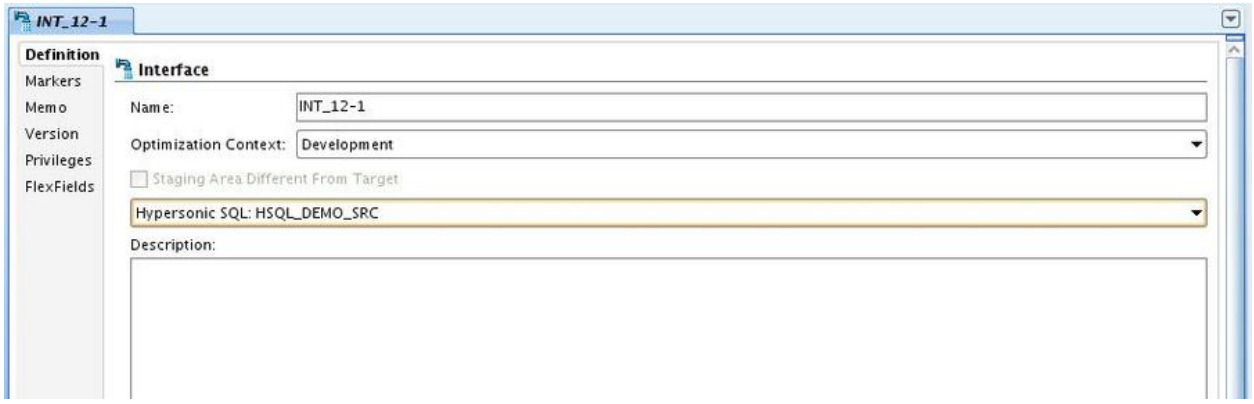
2) Develop ODI Temporary interface.

   a) If not connected, connect to PTS Training Work Repository (User: SUPERVISOR, Password: SUPERVISOR). Click Designer tab.

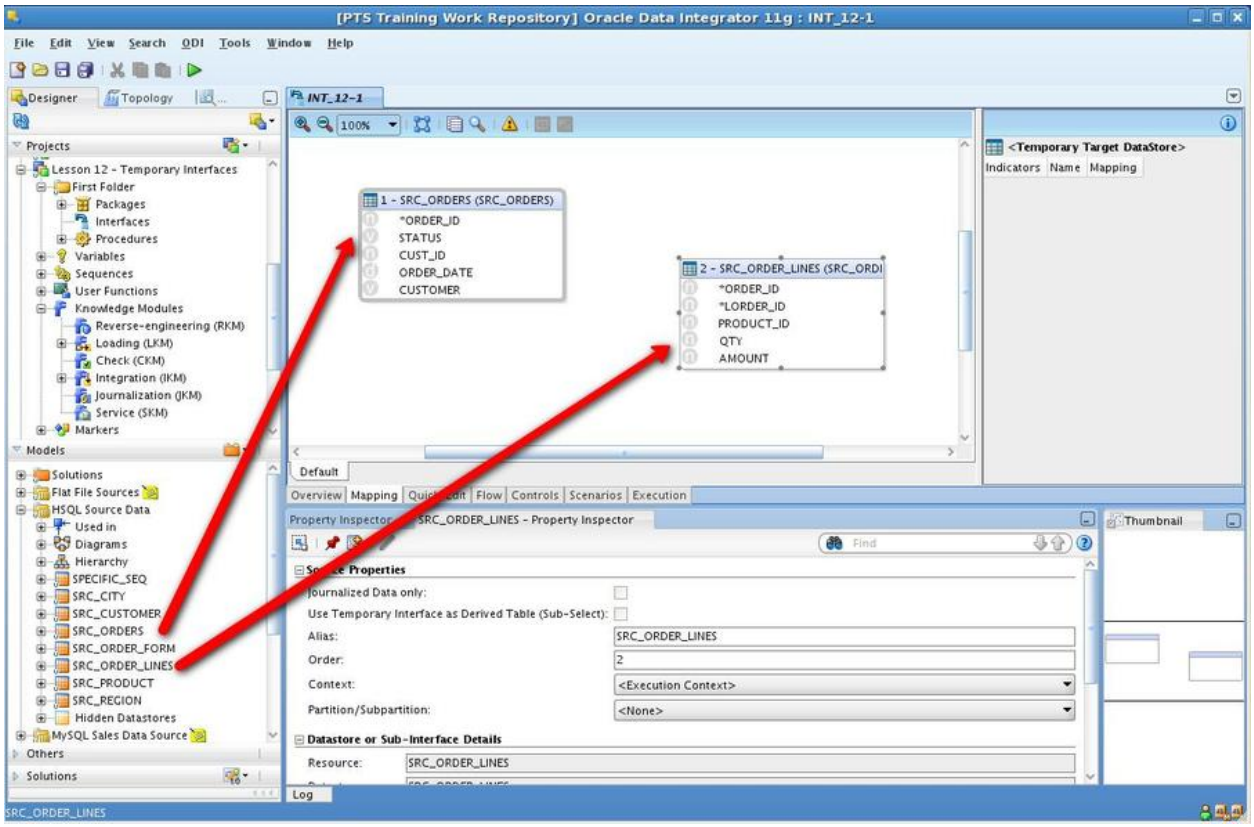


   b) In the Projects tab, expand: **Lesson 12 – Temporary Interfaces**. Right-click Interfaces, and then select New Interface. Name the new interface INT_12-1. For Staging Area, select HYPERSONIC SQL: HSQL SOURCE DATA. Click Mapping tab.

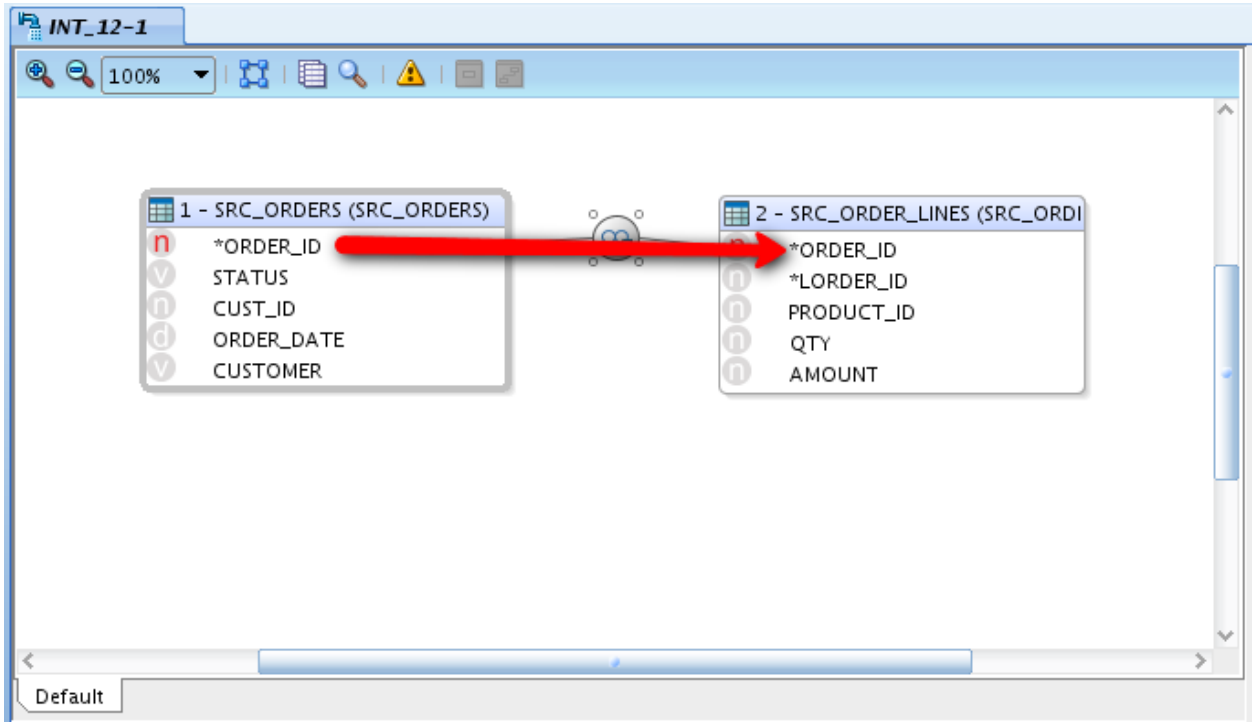




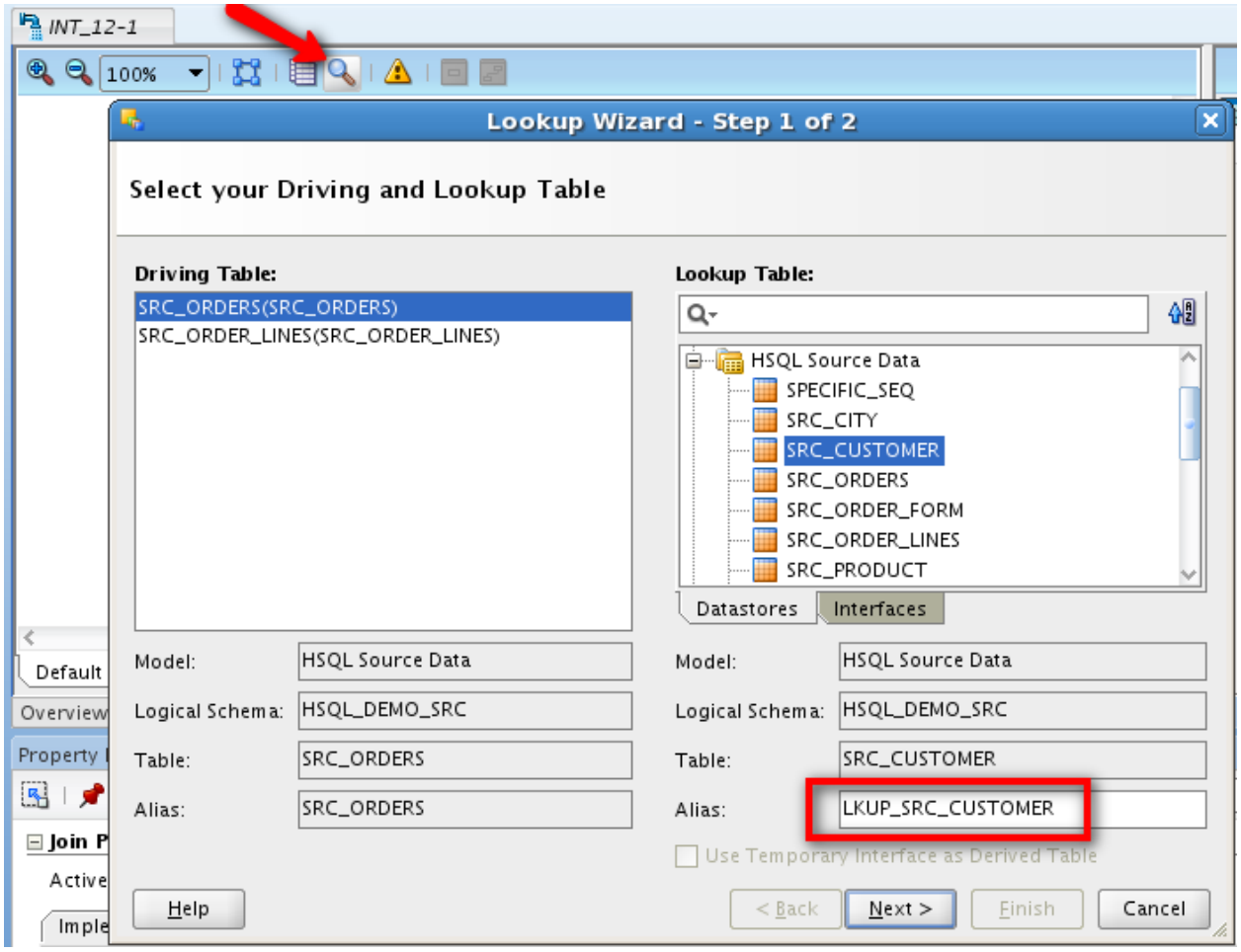
c) Open Models tab. Expand HSQL Source Data model, and drag SRC_ORDERS and SRC_ORDER_LINES datastores from the model to the Source area.

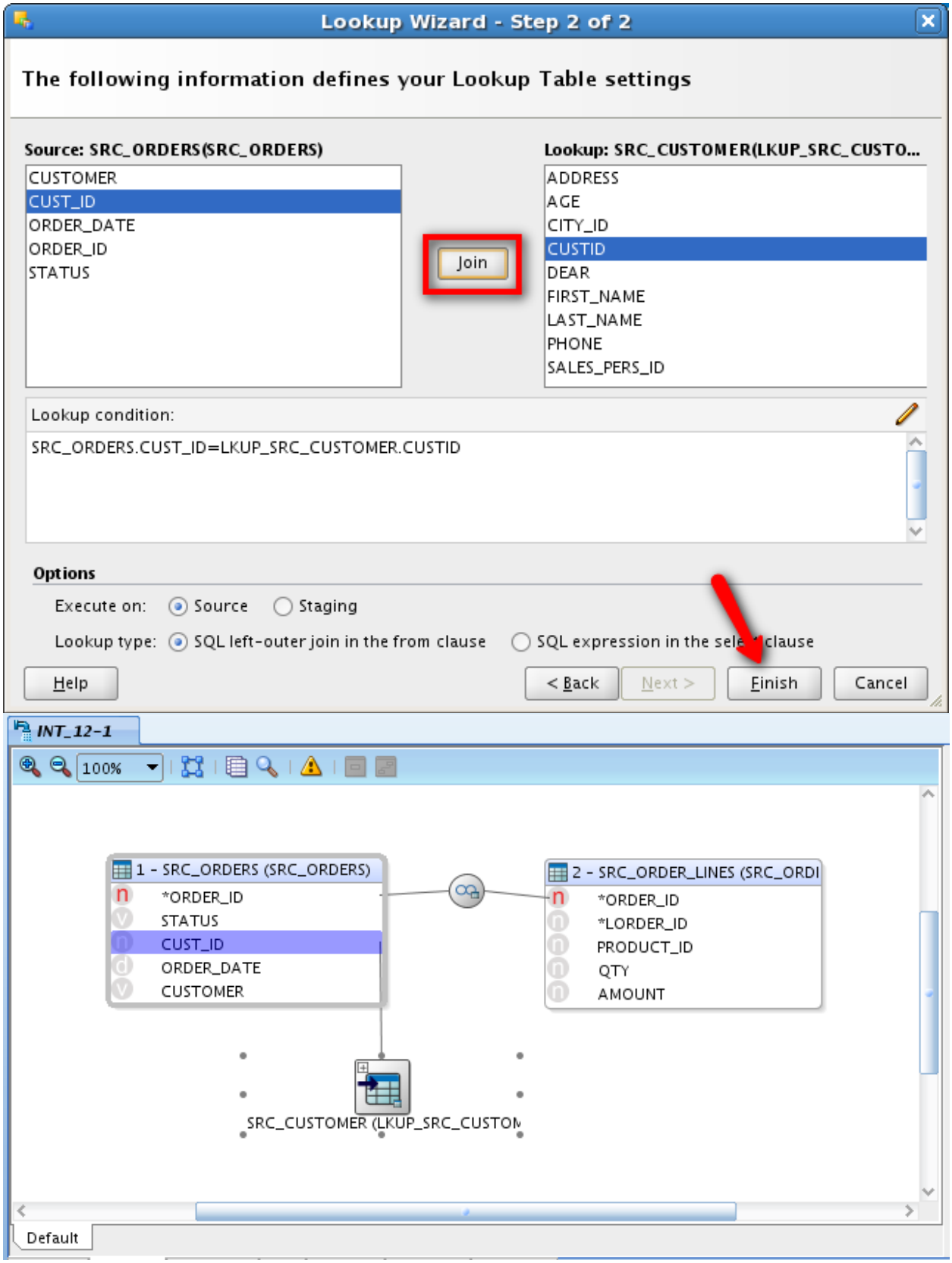


d) Drag ORDER_ID column from datastore SRC_ORDERS to datastore SRC_ORDER_LINES to create a Join.

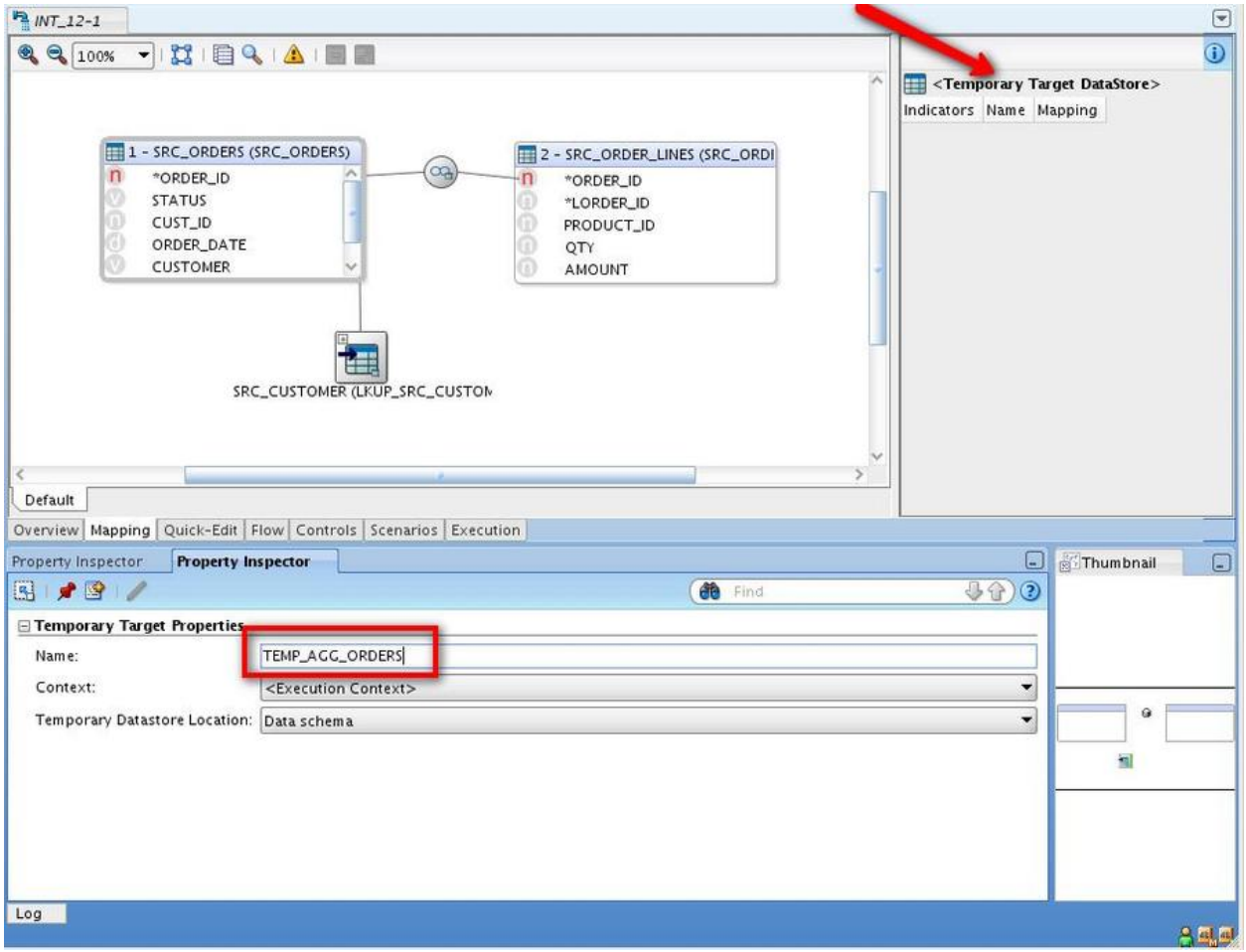


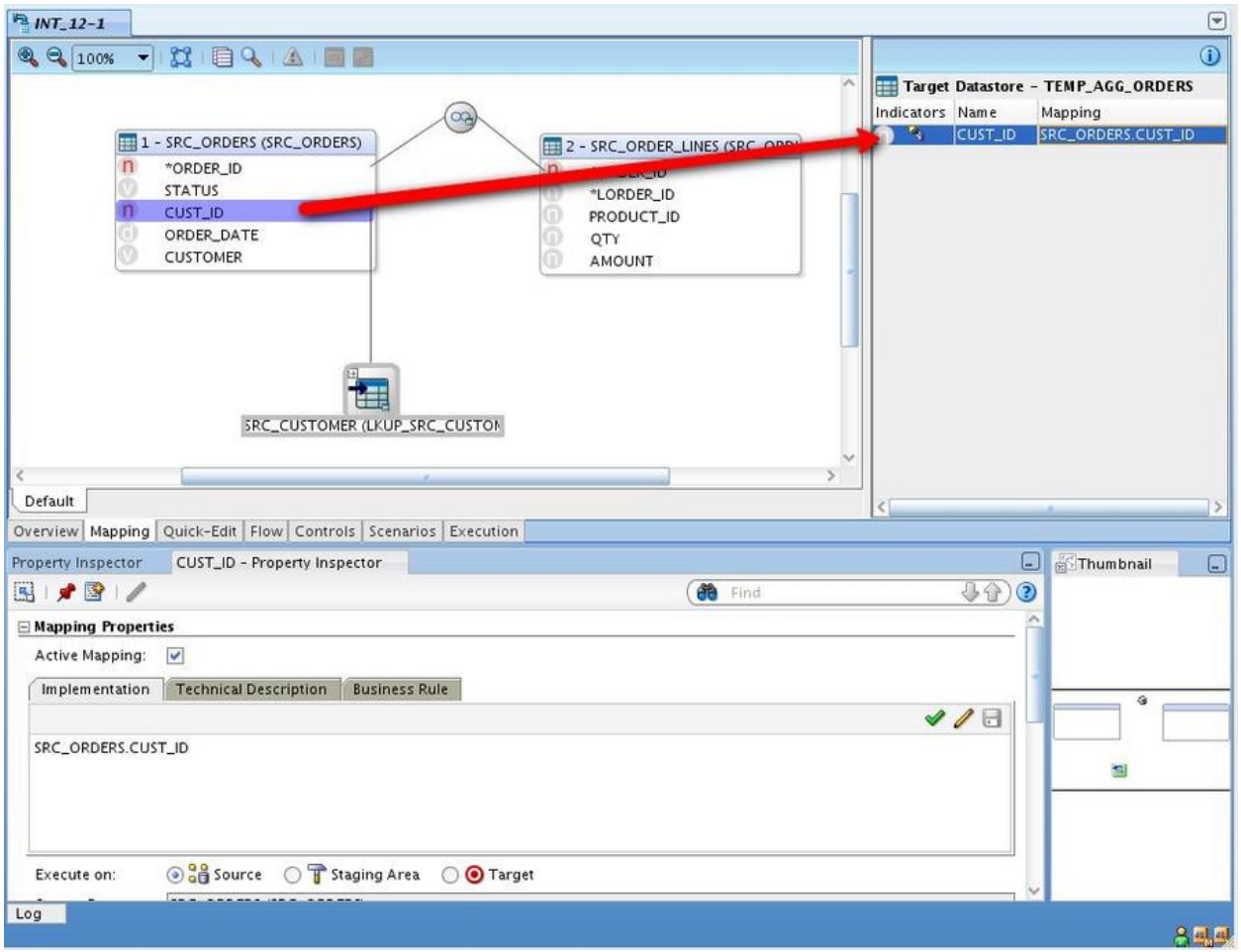
e) Click Lookup icon to start Lookup Wizard  . Make sure your Driving table is SRC_ORDERS. Select Lookup table SRC_CUSTOMER in HSQL Source Data model. For Lookup table, edit the Alias to read: LKUP_SRC_CUSTOMER as shown below. Click Next. Select CUST_ID column in the source table and CUSTID column in the lookup table, and then click Join. Click Finish.



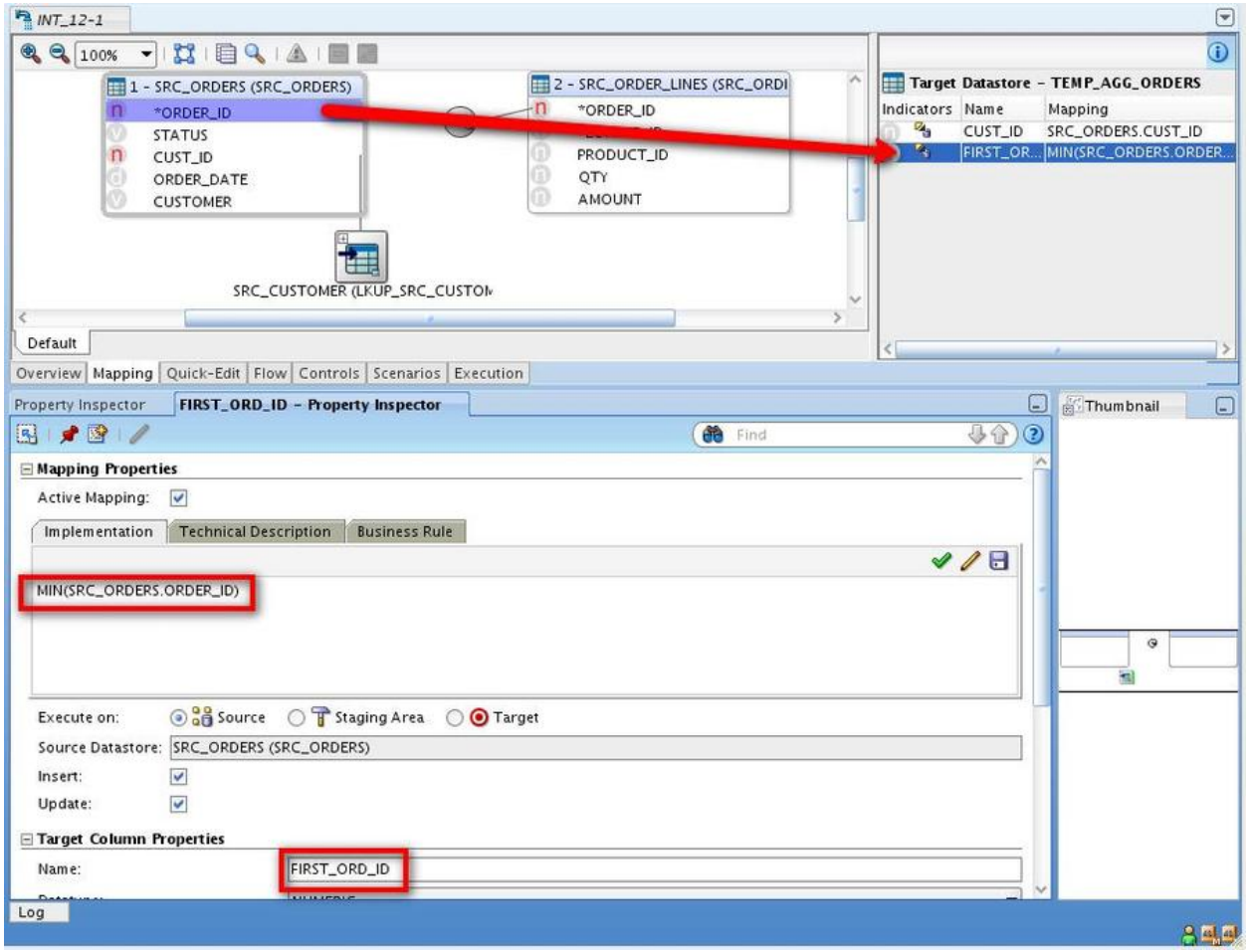

Lookup Wizard - Step 2 of 2
The following information defines your Lookup Table settings
Source: SRC_ORDERS(SRC_ORDERS)
CUSTOMER
CUST_ID
ORDER_DATE
ORDER_ID
STATUS
Join
Lookup: SRC_CUSTOMER(LKUP_SRC_CUSTO...
ADDRESS
AGE
CITY_ID
CUSTID
DEAR
FIRST_NAME
LAST_NAME
PHONE
SALES_PERS_ID
Lookup condition:
SRC_ORDERS.CUST_ID=LKUP_SRC_CUSTOMER.CUSTID
Options
Execute on: Source Staging
Lookup type: SQL left-outer join in the from clause
Help
< Back
Next >
Finish
Cancel
INT_12-1
100%
1 - SRC_ORDERS (SRC_ORDERS)
*ORDER_ID
STATUS
CUST_ID
ORDER_DATE
CUSTOMER
2 - SRC_ORDER_LINES (SRC_ORDI
*ORDER_ID
*LORDER_ID
PRODUCT_ID
QTY
AMOUNT
SRC_CUSTOMER (LKUP_SRC_CUSTOM
Default

f) Now you need to create a temporary target datastore. Drag column CUST_ID from SRC_ORDERS table to the Target area. Click <Temporary Target DataStore>. In the Temporary Target Properties, enter Name: TEMP_AGG_ORDERS as shown below.

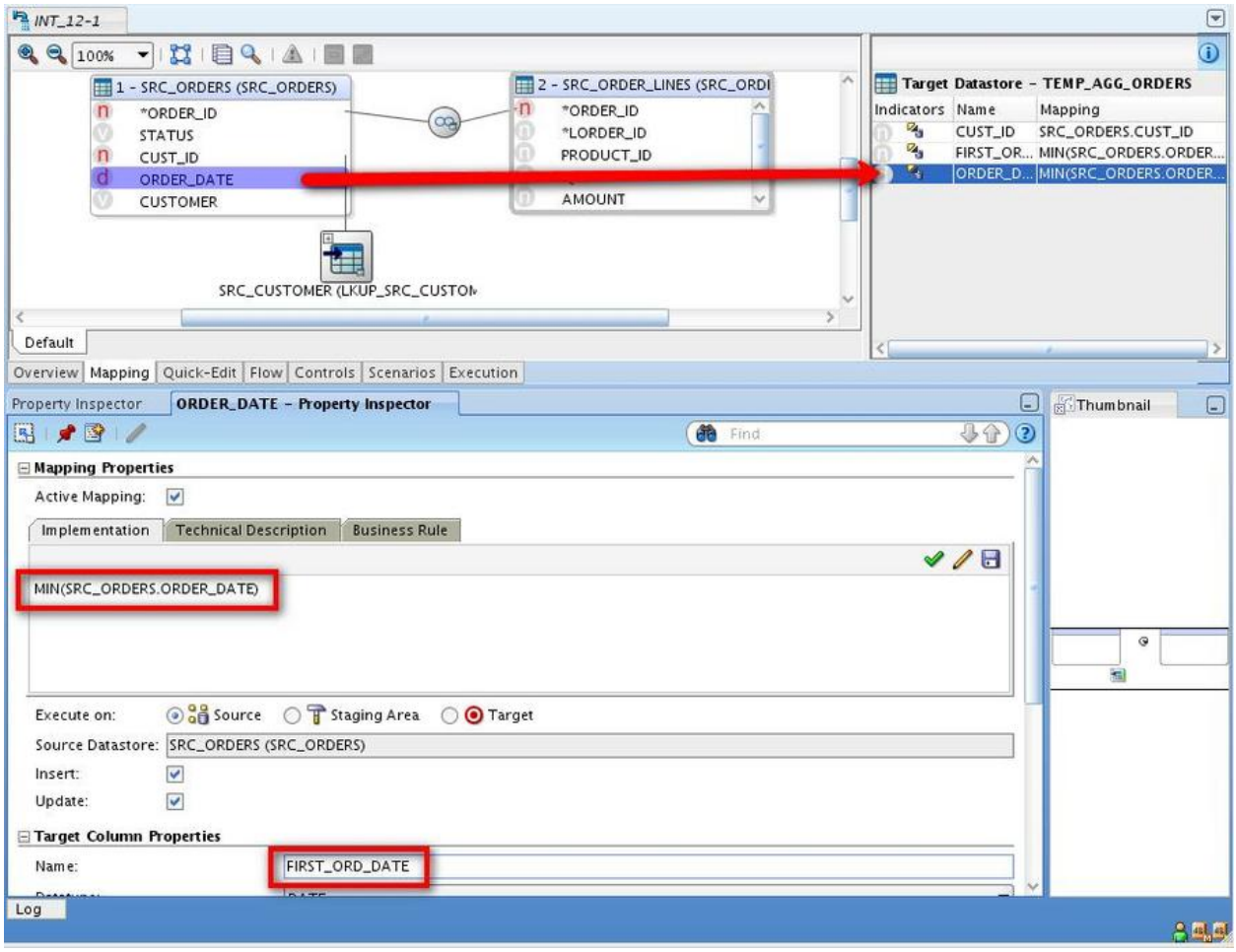



INT_12-1
100%
1 - SRC_ORDERS (SRC_ORDERS)
*ORDER_ID
STATUS
CUST_ID
ORDER_DATE
CUSTOMER
2 - SRC_ORDER_LINES (SRC_ORD
*LORDER_ID
PRODUCT_ID
QTY
AMOUNT
SRC_CUSTOMER (LKUP_SRC_CUSTOM
Target Datastore - TEMP_AGG_ORDERS
Indicators
Name
Mapping
CUST_ID
SRC_ORDERS.CUST_ID
Default
Overview
Mapping
Quick-Edit
Flow
Controls
Scenarios
Execution
Property Inspector
CUST_ID - Property Inspector
Find
Thumbnail
Mapping Properties
Active Mapping:
Implementation
Technical Description
Business Rule
SRC_ORDERS.CUST_ID
Execute on:
Source
Staging Area
Target
Log

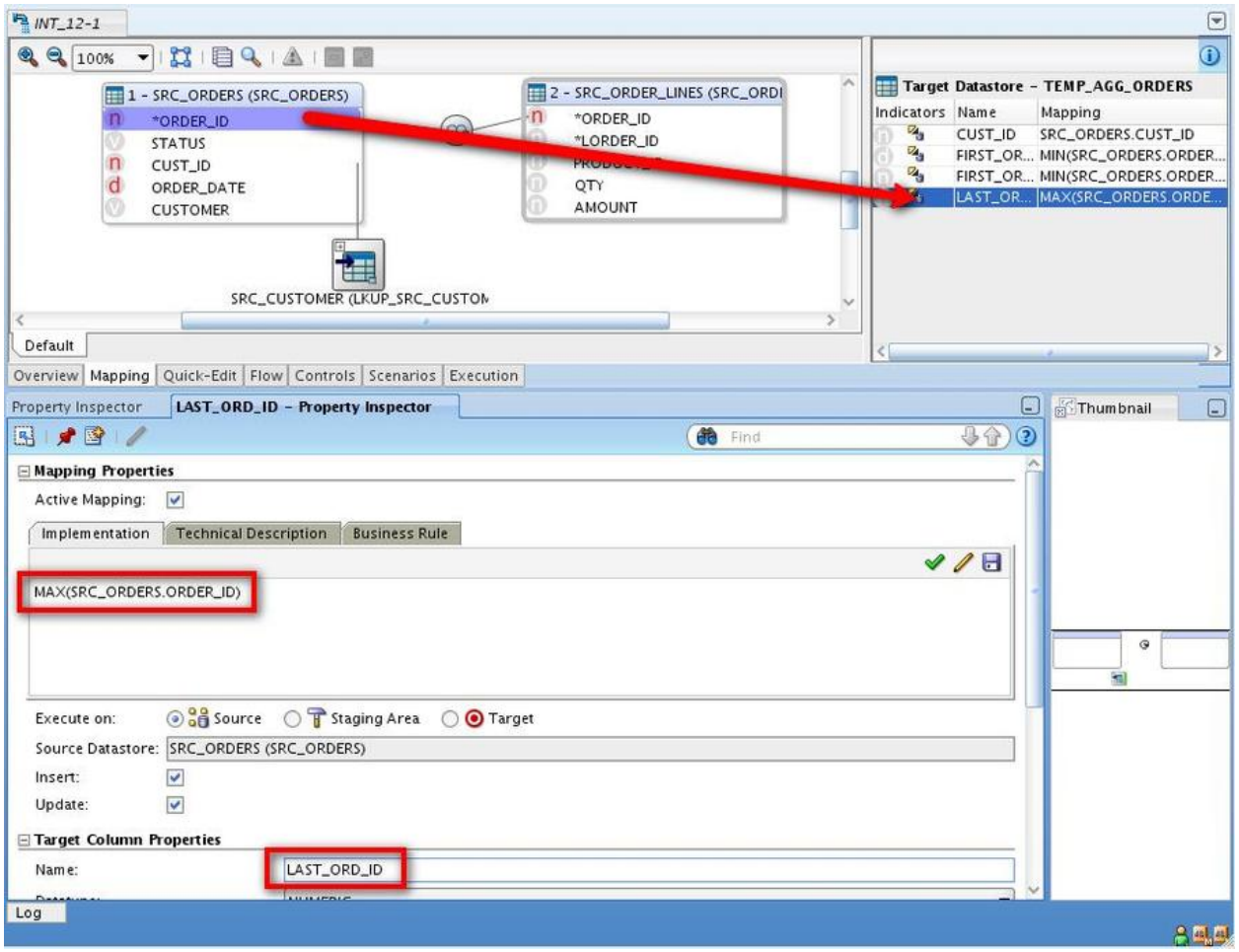
g) Drag column ORDER_ID from SRC_ORDERS to the Target area. Edit mapping to read: MIN(SRC_ORDERS.ORDER_ID). Scroll down to the Target Column Properties section and rename this column to FIRST_ORD_ID. Click the interface tab and view the result.



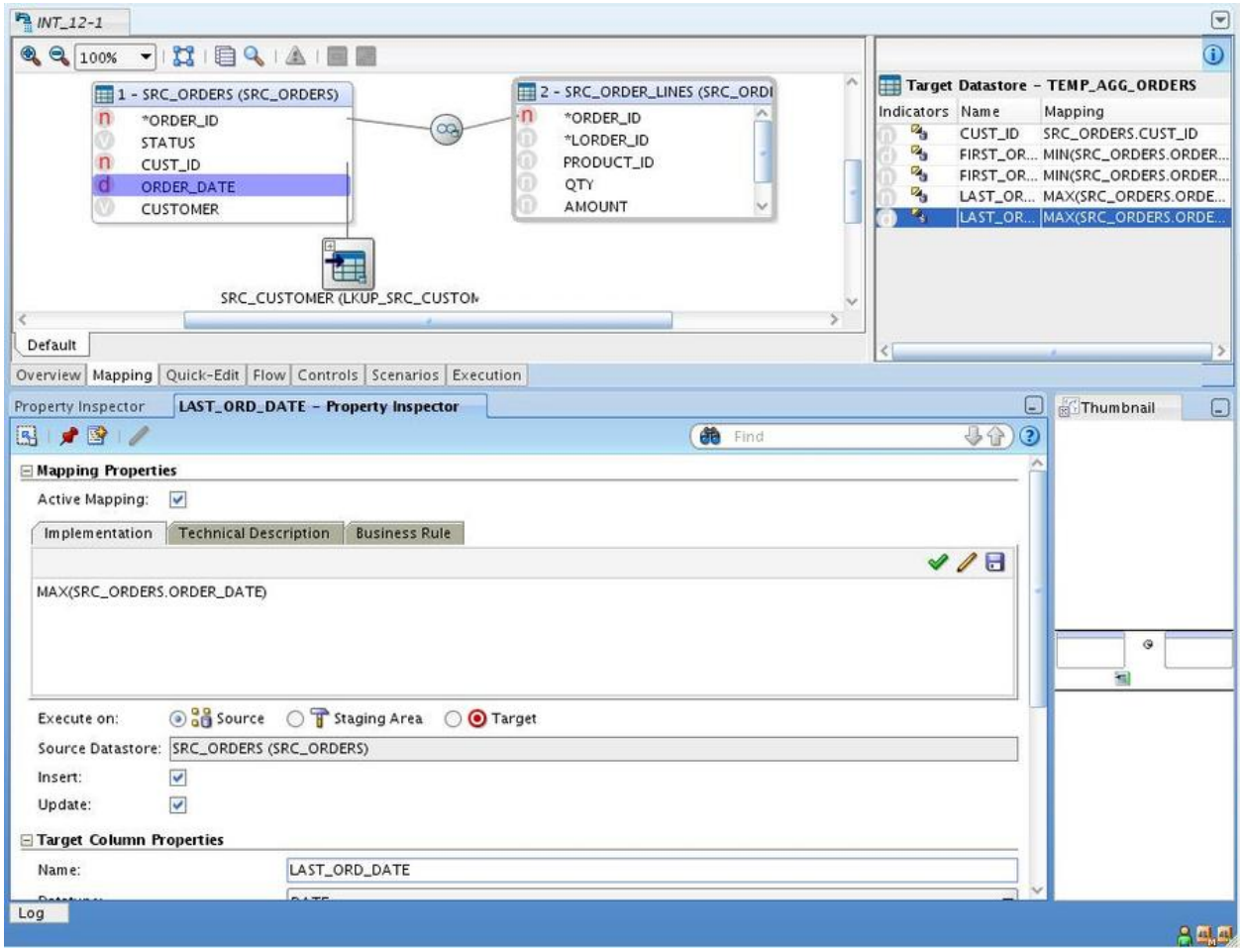
h) Drag column ORDER_DATE from SRC_ORDERS to the Target area. Edit mapping to read: MIN(SRC_ORDERS. ORDER_DATE). Scroll down and rename this column to FIRST_ORD_DATE.



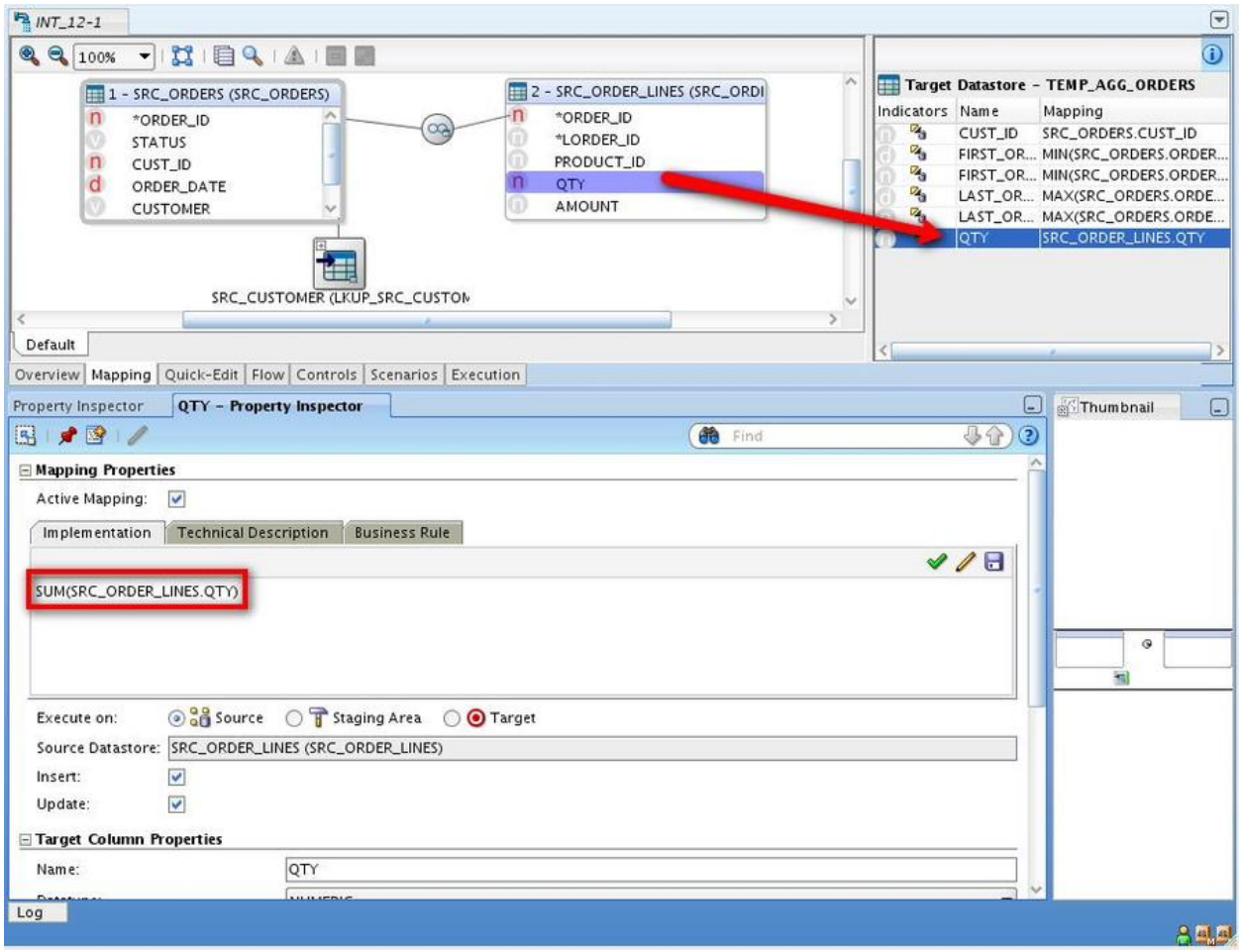
i) Again, drag column Order_ID from SRC_ORDERS to the Target area. Edit mapping to read: MAX(SRC_ORDERS.ORDER_ID). Scroll down and rename this column to LAST_ORD_ID.



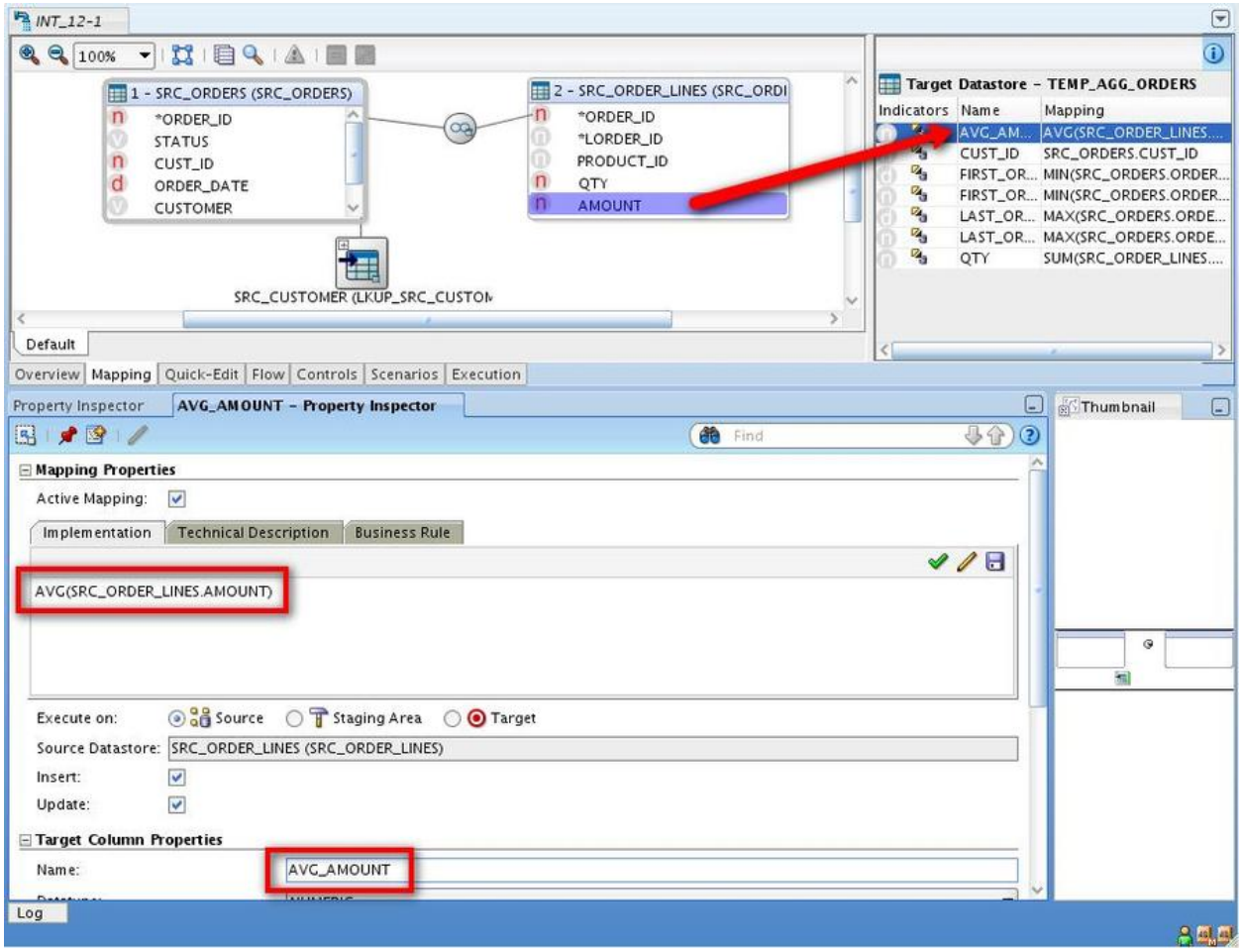
j) Similarly, drag column ORDER_DATE again from SRC_ORDERS to the Target area. Edit the mapping to read: MAX(SRC_ORDERS. ORDER_DATE). Scroll down and rename this column to LAST_ORD_DATE.



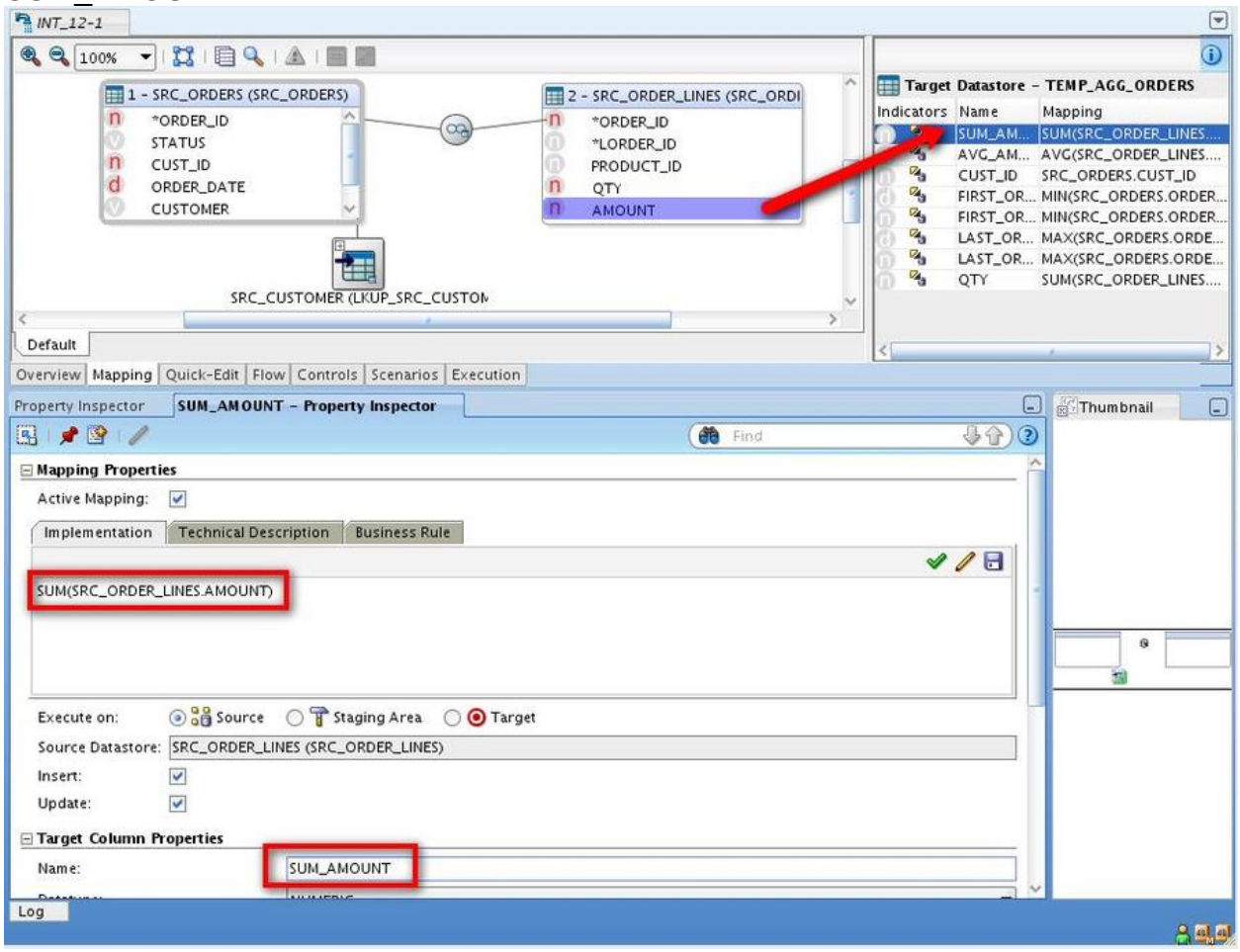
k) Drag column QTY from SRC_ORDER_LINES source datastore to the Target area. Edit mapping expression to read: SUM(SRC_ORDER_LINES.QTY).



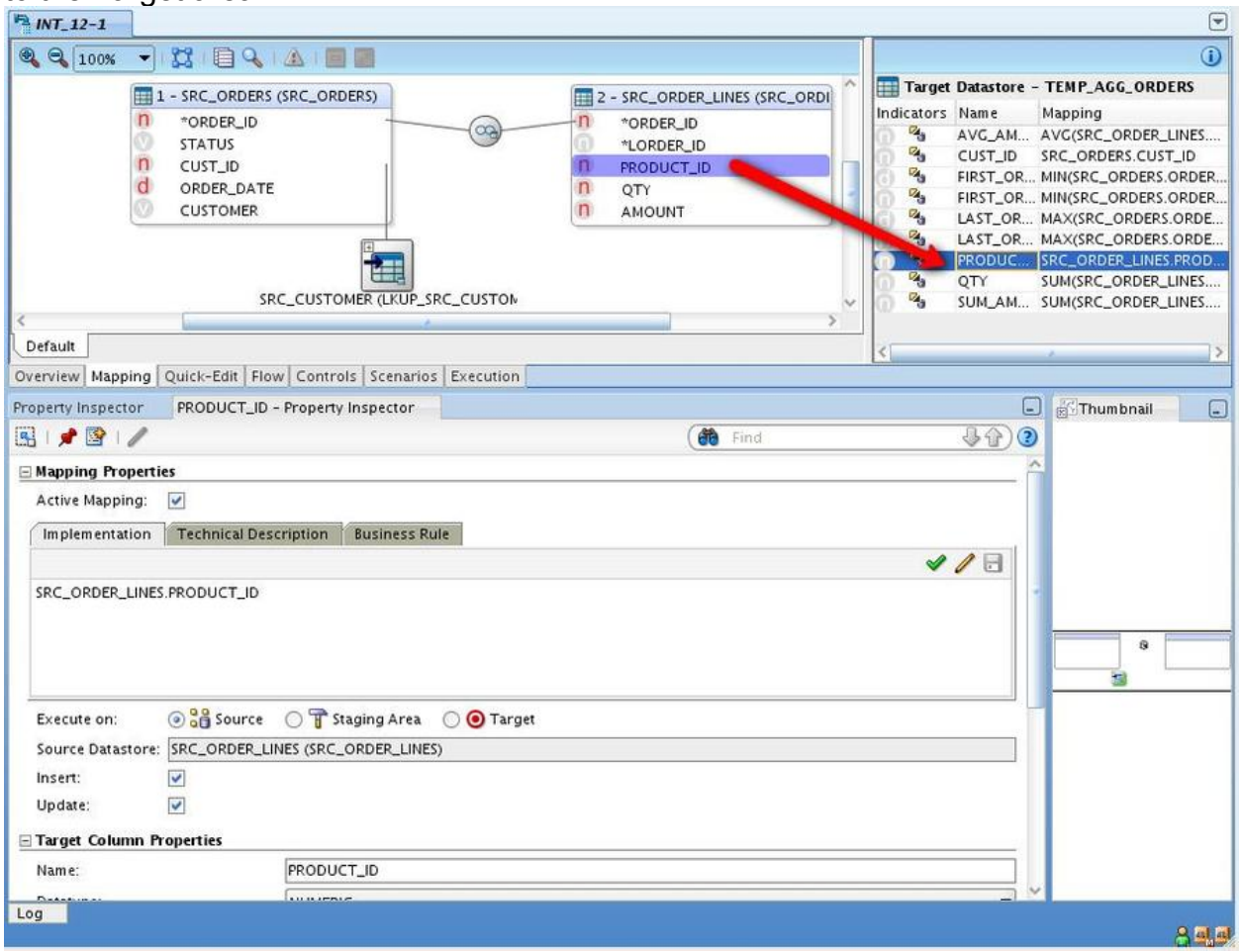
l) Drag column AMOUNT from SRC_ORDER_LINES source datastore to the Target area. Edit mapping expression to read: AVG(SRC_ORDER_LINES.AMOUNT). In the Target datastore, rename this column to AVG_AMOUNT.



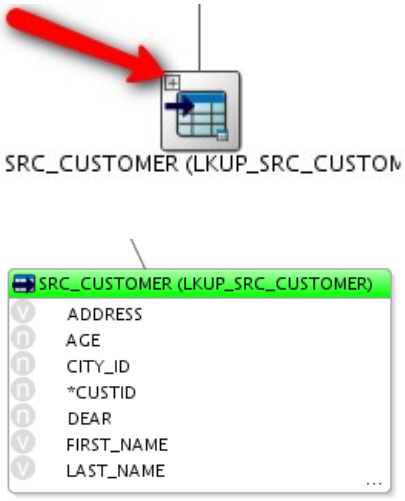
m) Drag again column AMOUNT from SRC_ORDER_LINES source datastore to the Target area. Edit mapping expression to read: SUM(SRC_ORDER_LINES.AMOUNT). Rename this column to SUM_AMOUNT.

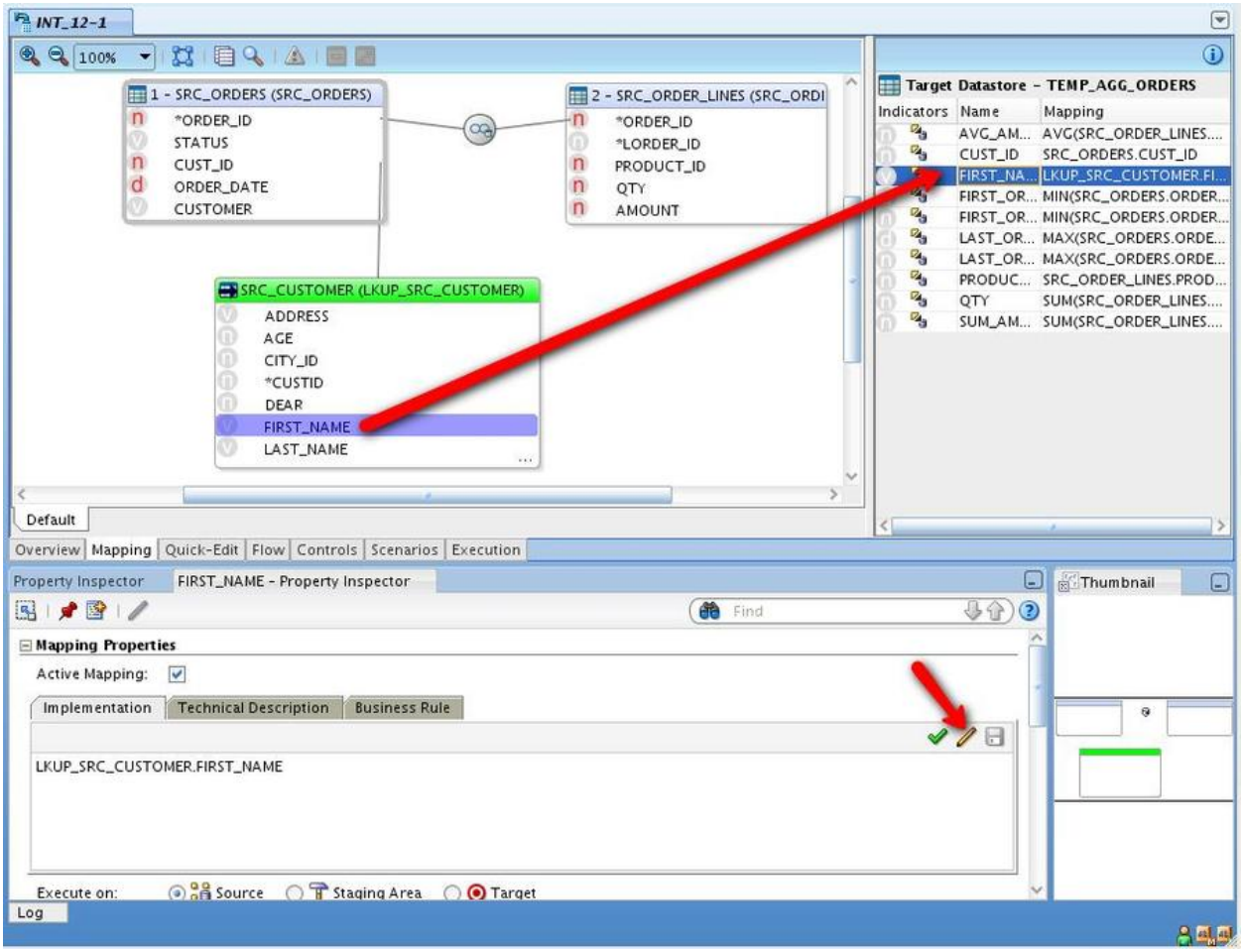


n) Drag column PRODUCT_ID from SRC_ORDER_LINES source datastore to the Target area.



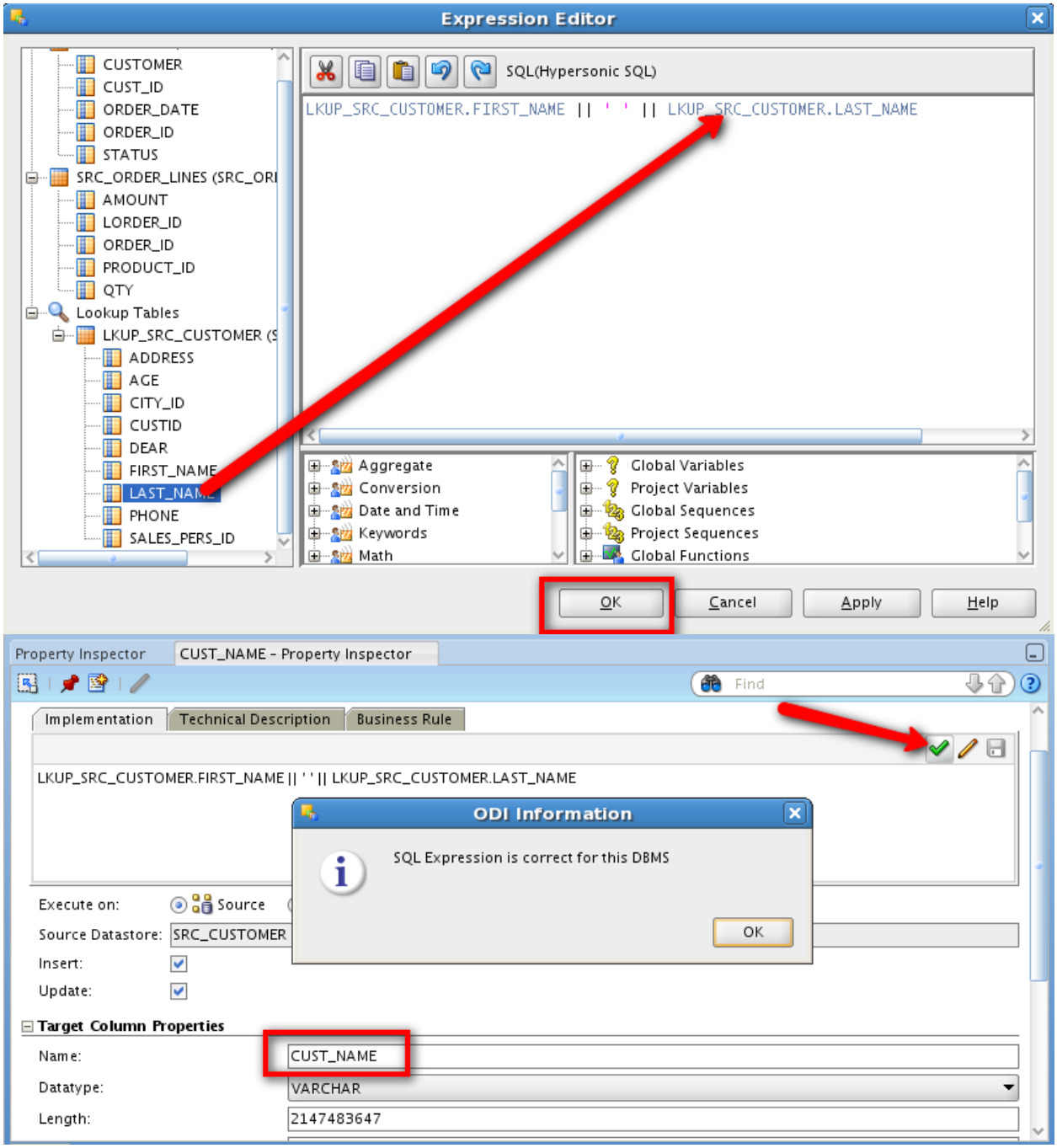
o) In the Source area, expand lookup datastore. Drag FIRST_NAME column from the lookup table to the Target area. In the Target area, click the FIRST_NAME column. Start Expression editor  , and then drag the LAST_NAME column from the left panel of Expression Editor to the expression



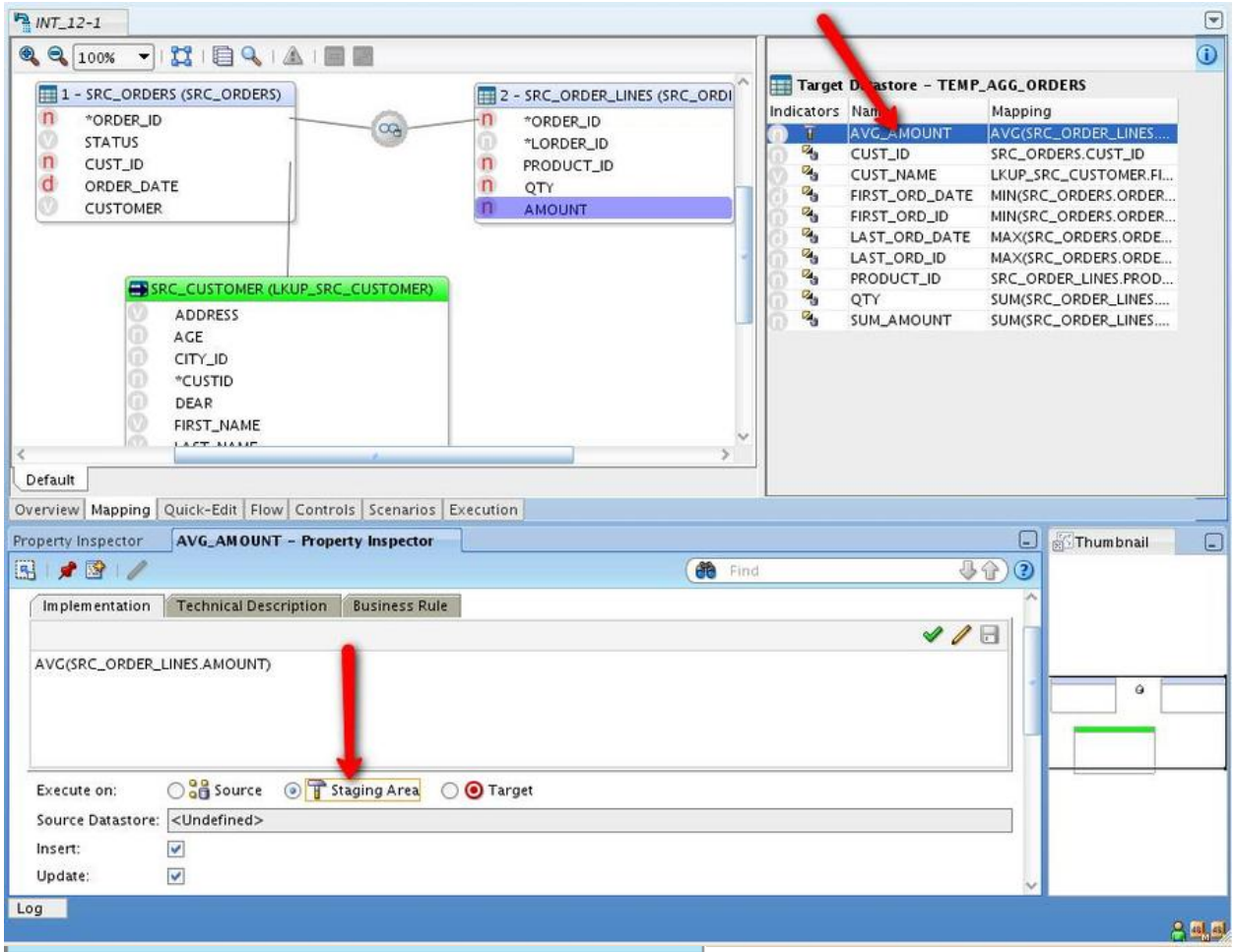


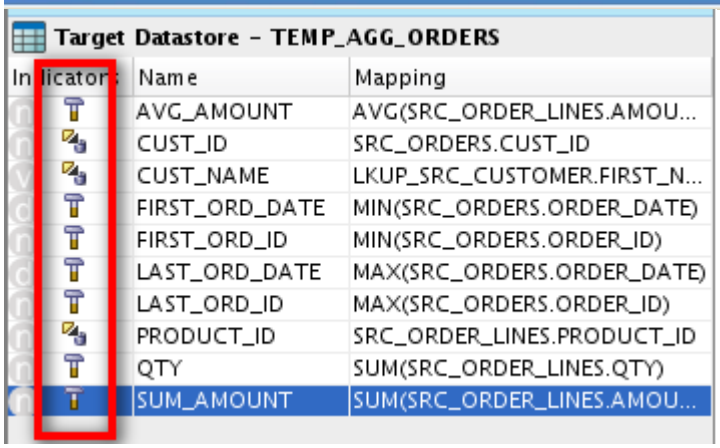
p) Edit the expression to read: LK_UP_SRC_CUSTOMER. FIRST_NAME | | ‘ ‘ || LK_UP_SRC_CUSTOMER.LAST_NAME as shown below. Click OK.

Click  button to validate the expression. Rename the column to CUST_NAME



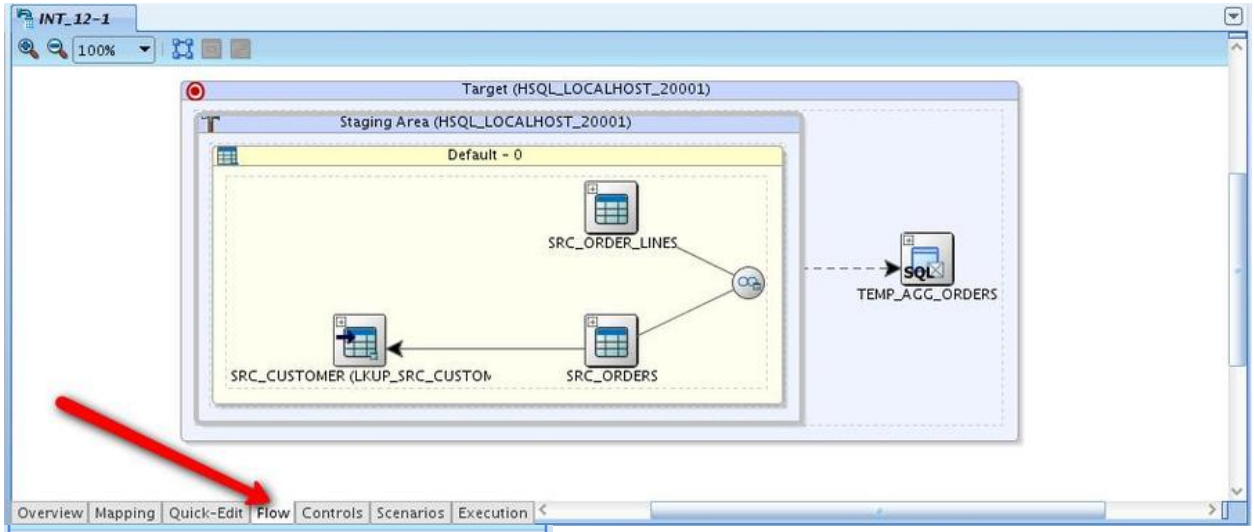
q) In the Target datastore, click AVG_AMOUNT column. In the Execute on section, select Staging Area. Repeat this step for all other columns, which have a function in mapping expression. Refer to the table below to verify execution location. Your Target datastore should now look as shown on the screenshot. Click Flow tab.

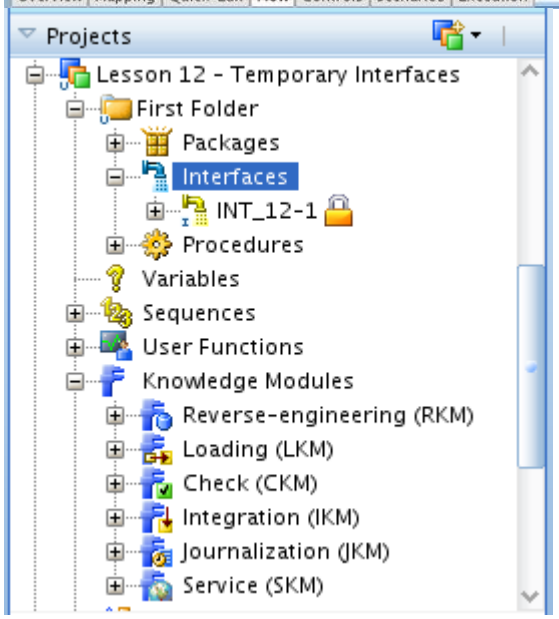




Column	Execution location
SUM_AMOUNT	Staging Area
AVG_AMOUNT	Staging Area
CUST_ID	Source
CUST_NAME	Source
FIRST_ORD_DATE	Staging Area
FIRST_ORD_ID	Staging Area
LAST_ORD_DATE	Staging Area
LAST_ORD_ID	Staging Area
PRODUCT_ID	Source
QTY	Staging Area

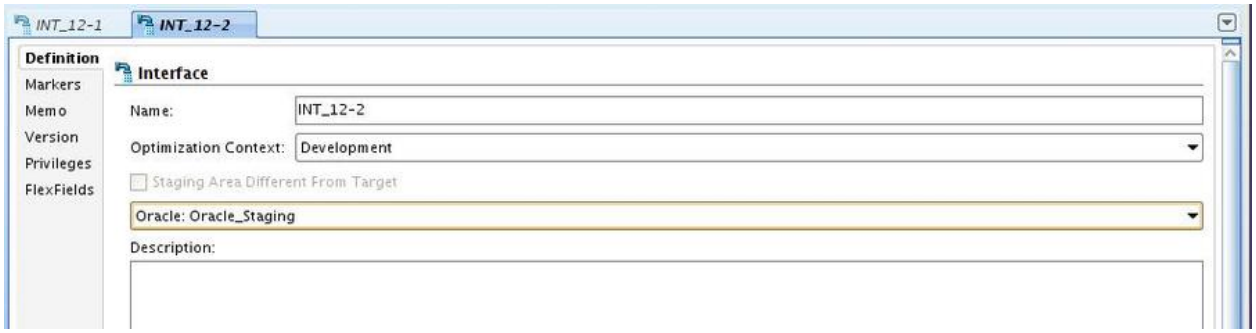
r) Verify the flow, and then save your temporary interface. Verify that your temporary interface appeared in the tree view. Close your interface tab. Note the color of your newly created temporary interface in the objects tree view.



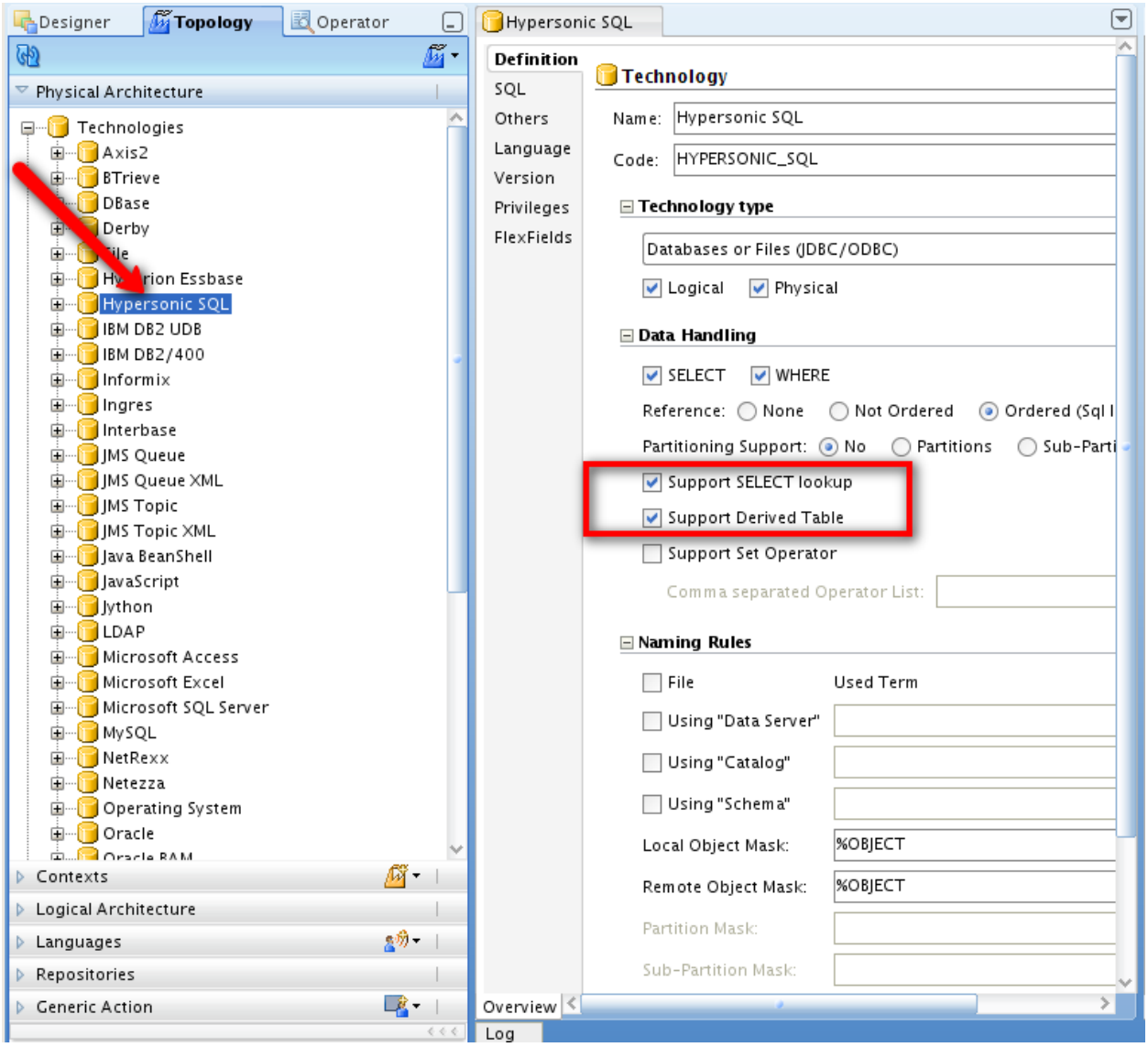


3) Create new interface, which use the newly created temporary interface as a source.

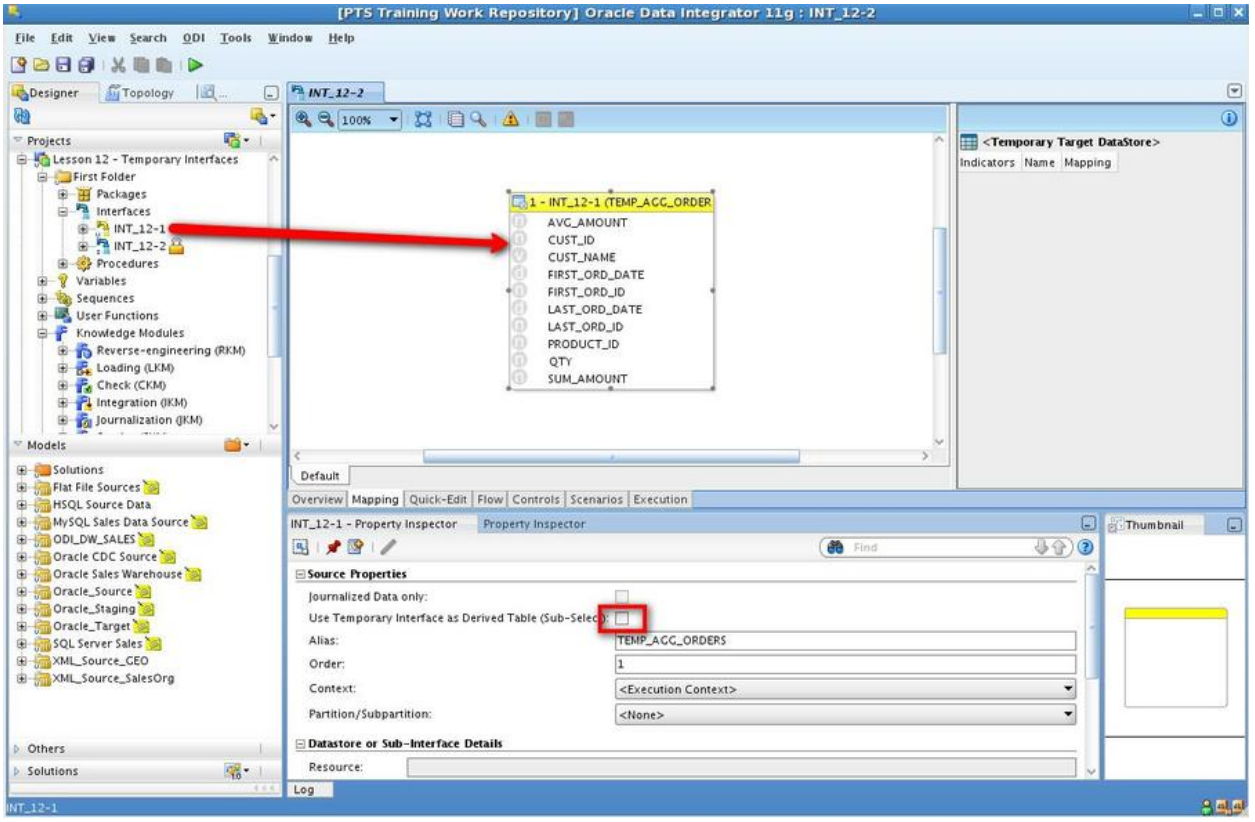
   a) In Lesson 12 – Temporary Interface project, start creating new ODI interface INT_12-2 as shown below. Open Mapping tab.



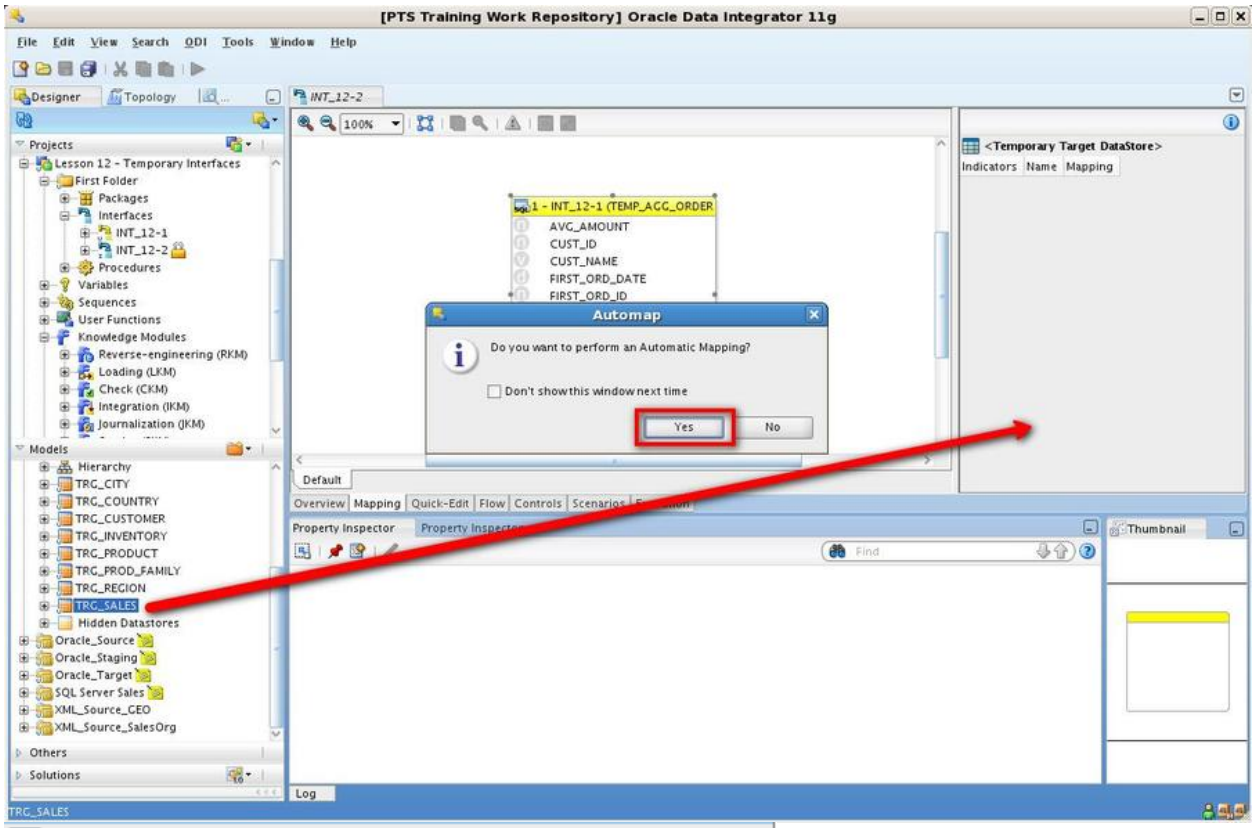
b) Check if the Source Technology has derived table support. Go to Topology, expand Physical Architecture and then double-click technology name. Enable this feature if disabled.



c) Drag temporary interface INT_12-1 from Projects tab to the Source area.



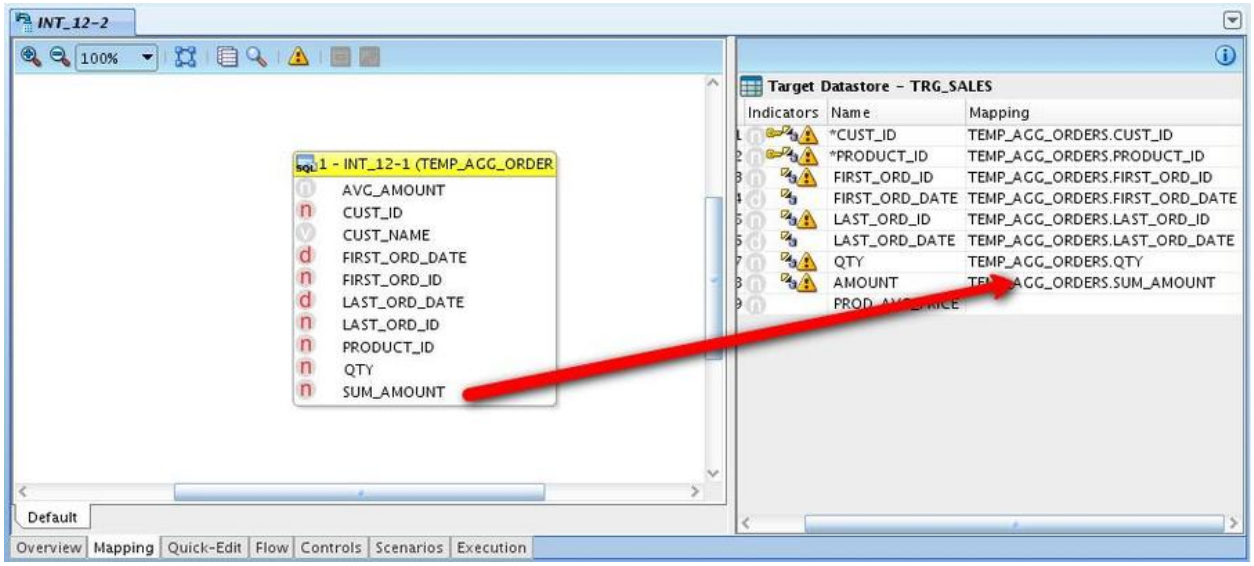
d) Drag datastore TRG_SALES form Oracle Sales Warehouse model to the Target Datastore area. Click Yes to perform automatic mapping.



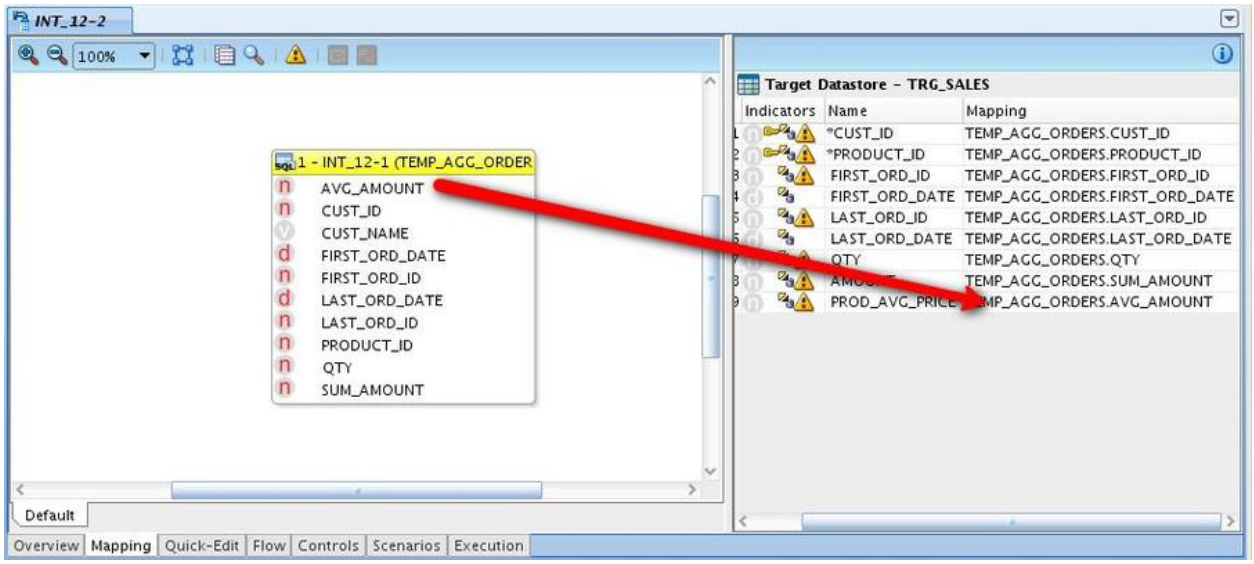
Target Datastore – TRG_SALES

Position	Indicators	Name	Mapping
1		*CUST_ID	TEMP_AGG_ORDERS.CUST_ID
2		*PRODUCT_ID	TEMP_AGG_ORDERS.PRODUCT
3		FIRST_ORD_ID	TEMP_AGG_ORDERS.FIRST_ORI
4		FIRST_ORD_DATE	TEMP_AGG_ORDERS.FIRST_ORI
5		LAST_ORD_ID	TEMP_AGG_ORDERS.LAST_ORD
6		LAST_ORD_DATE	TEMP_AGG_ORDERS.LAST_ORD
7		QTY	TEMP_AGG_ORDERS.QTY
8		AMOUNT	
9		PROD_AVG_PRICE	

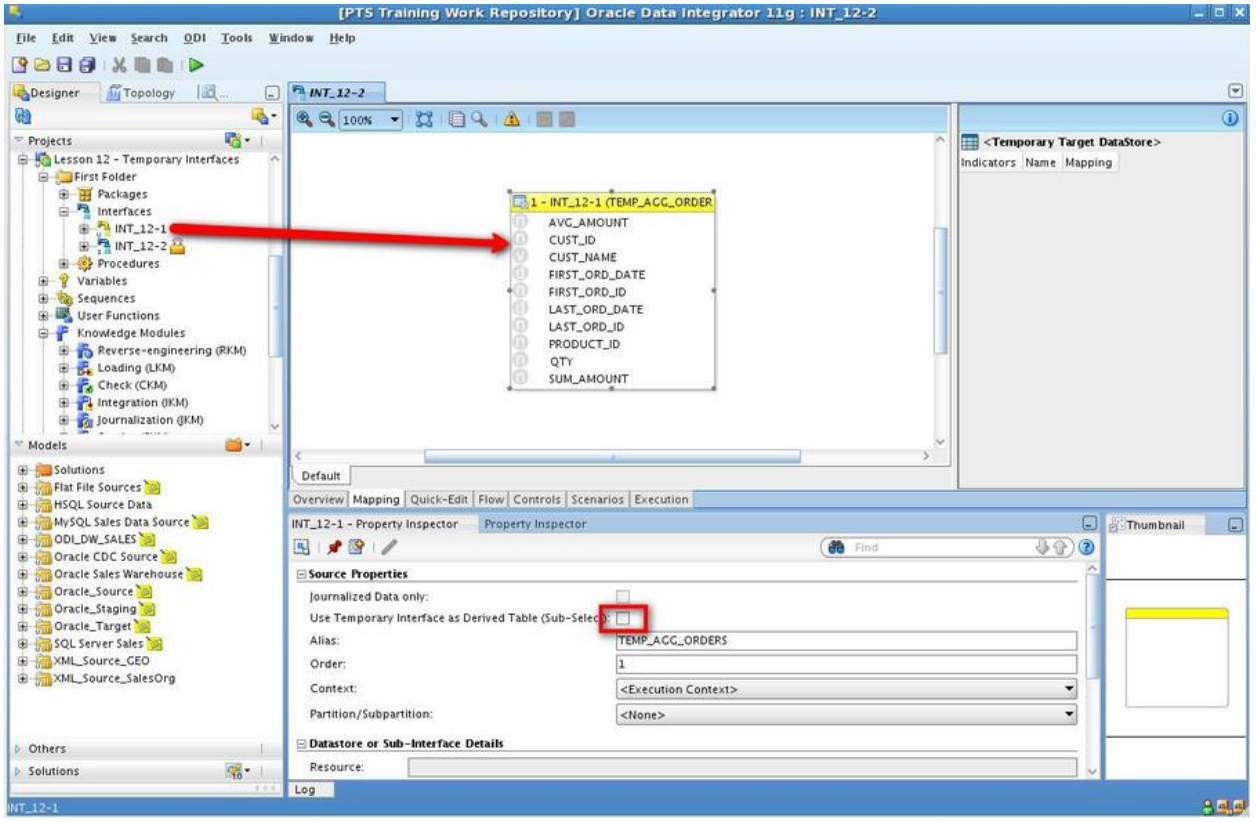
In the target datastore, select AMOUNT column. Drag SUM_AMOUNT column from the temporary interface in the source area to the Implementation tab in Mapping Properties area.

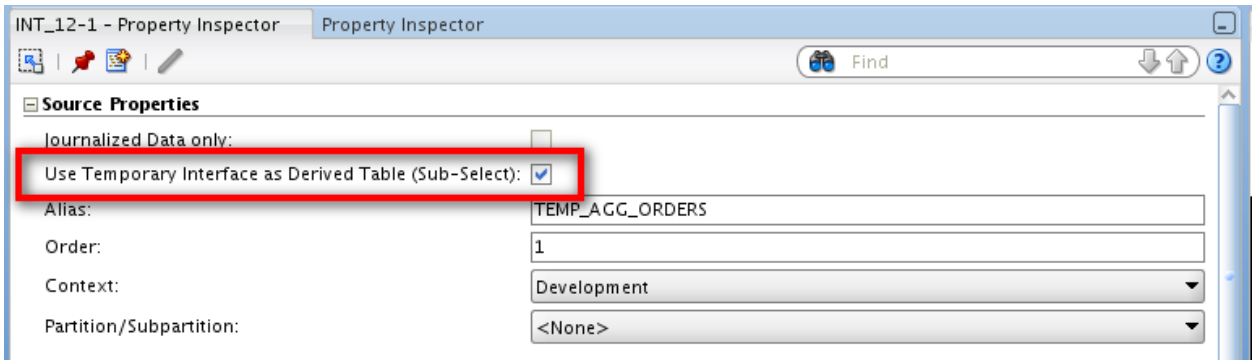


e) Repeat previous step to map PROD_AVG_PRICE to AVG_AMOUNT column in the temporary interface as shown below.

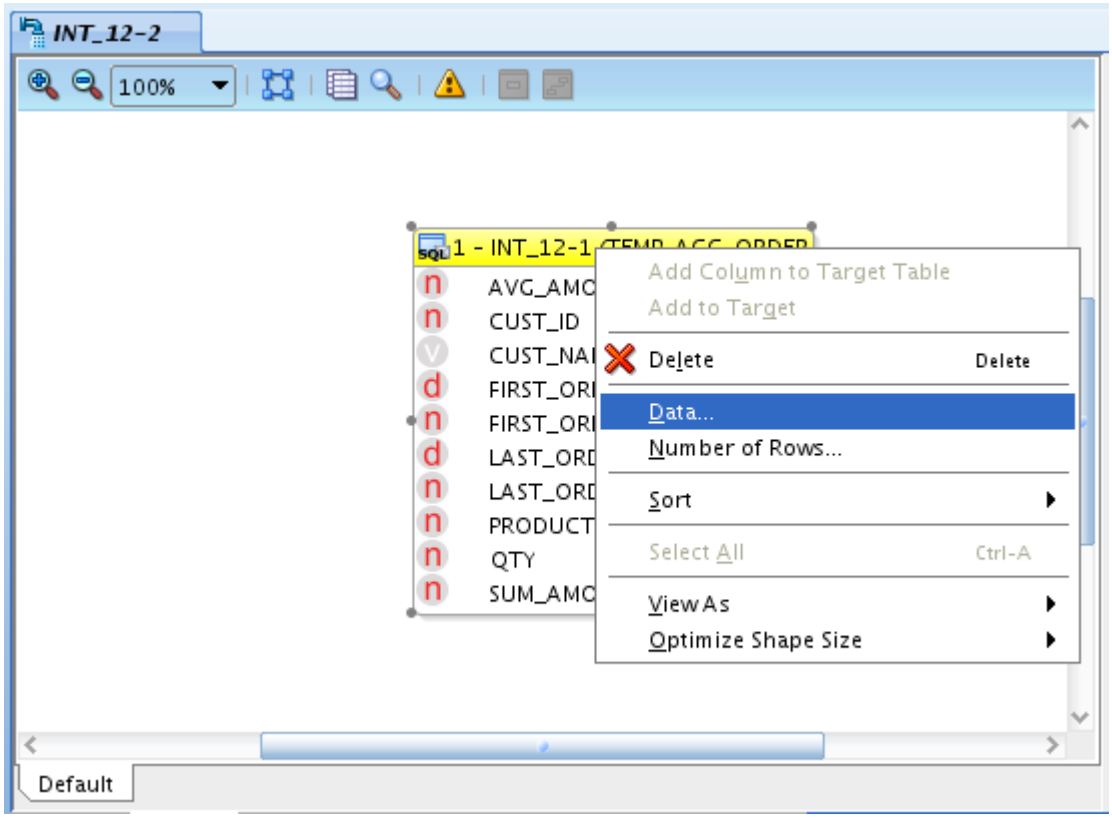


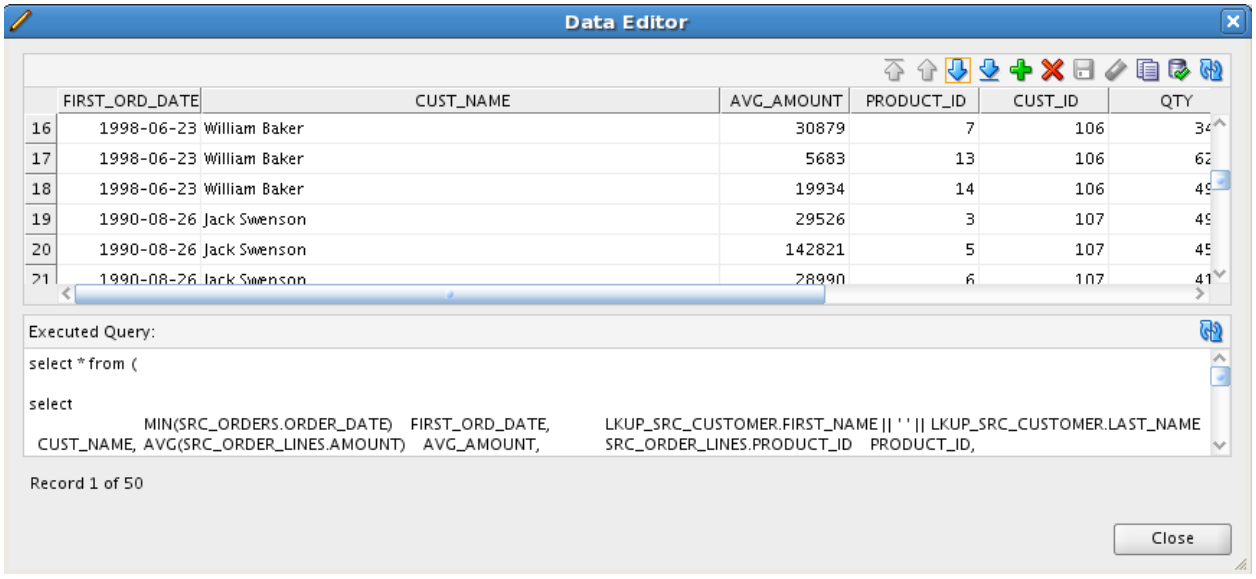
f) In the Source panel, click INT_12-1 (TEMP_AGG_ORDERS), scroll-down to the Source properties section, and then select “Use Temporary Interface as Derived Table (Sub-Select)” checkbox.



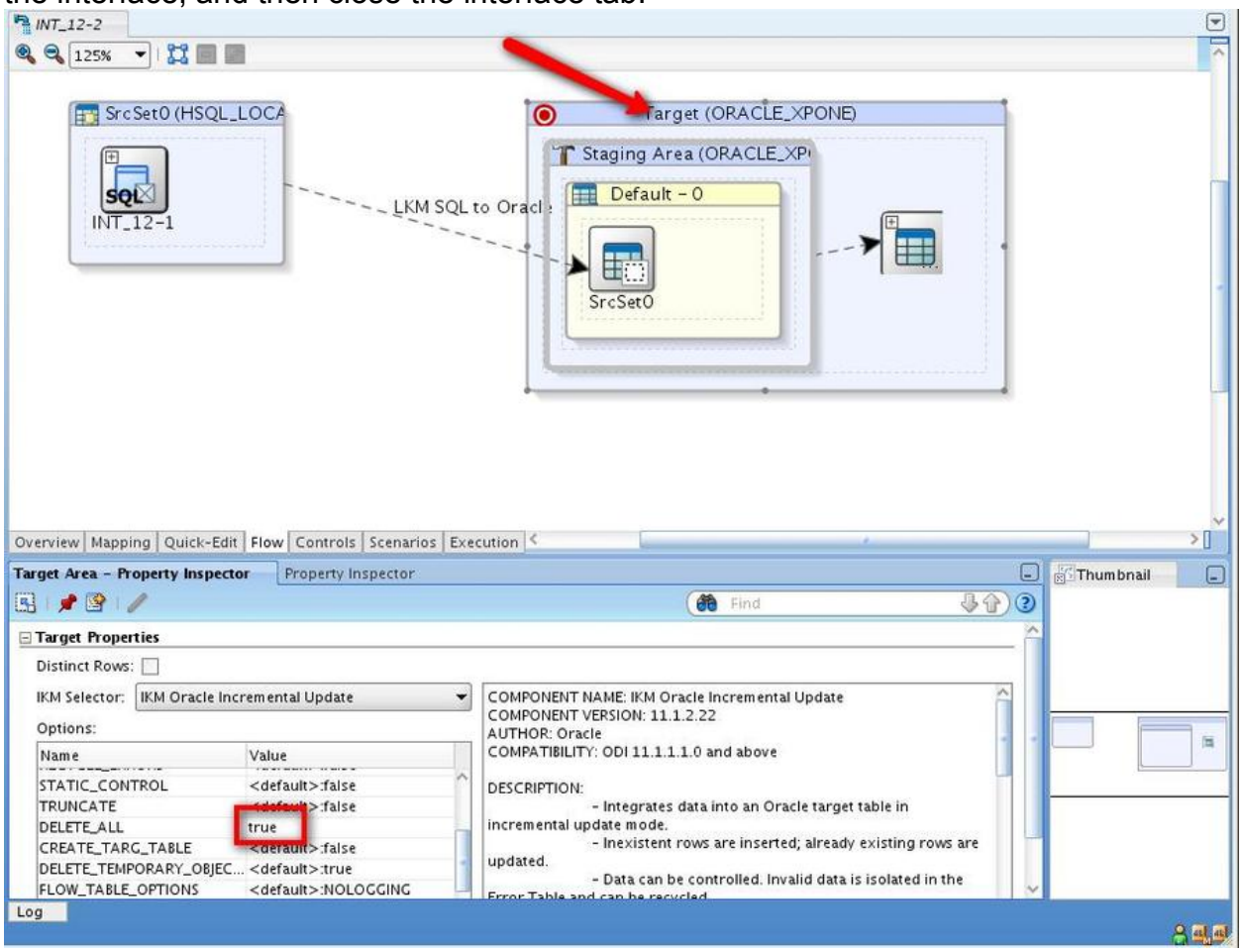


g) To view data derived from the temporary interface, right-click the temporary interface and select Data. Close Data Editor window.

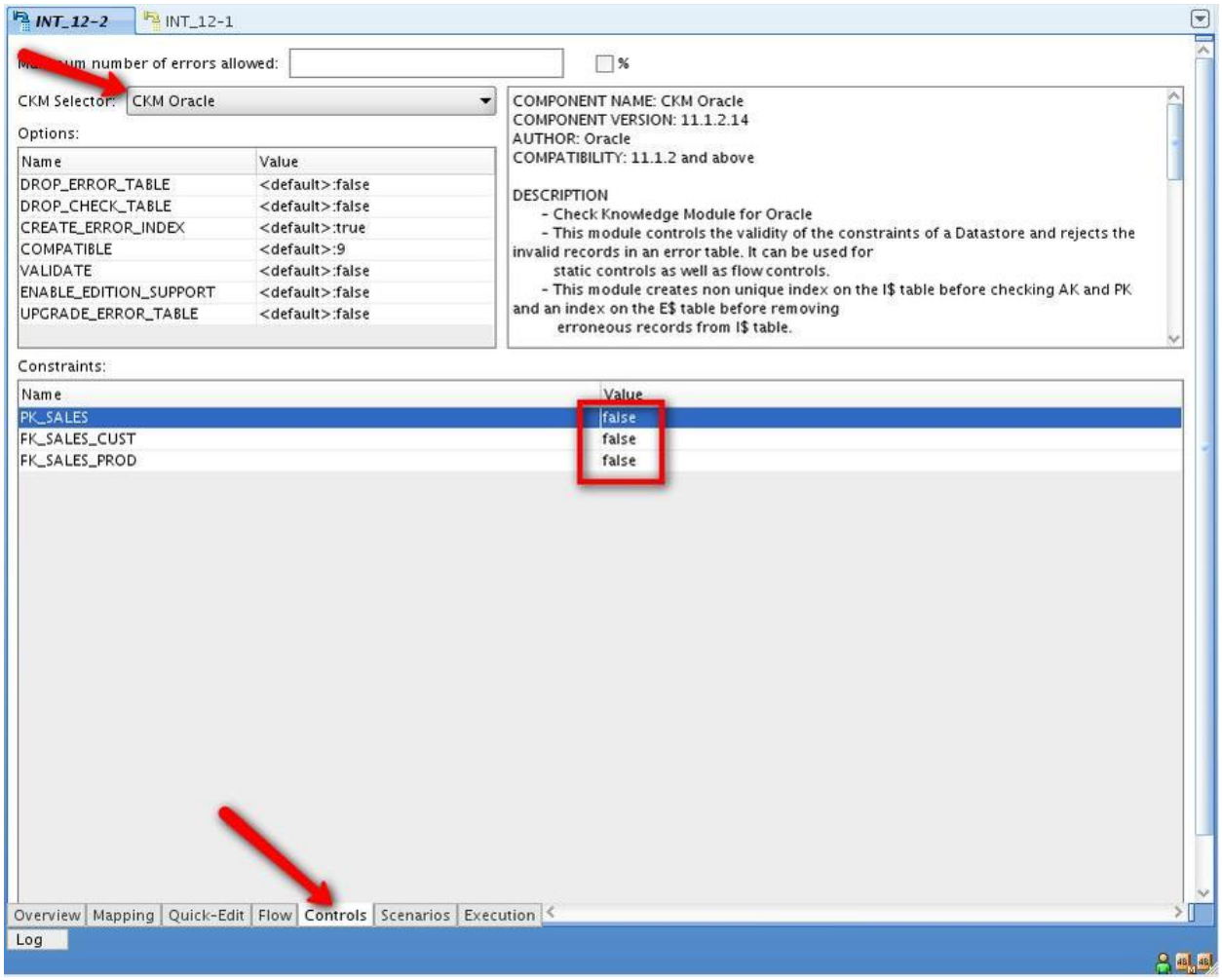




h) Select Flow tab, click Target datastore, and verify the flow of your interface. In the Target Properties, set DELETE_ALL option to true. Save the interface, and then close the interface tab.

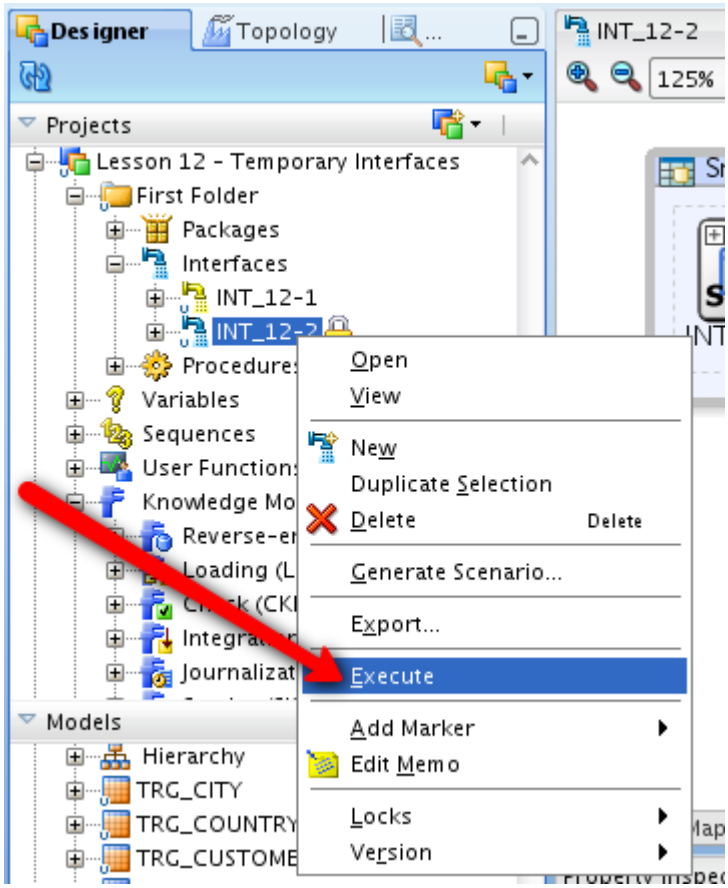


i) Disable check constraints on Target datastore, since there are no corresponding foreign keys. Click on Controls Tab and set all the constraints to false.

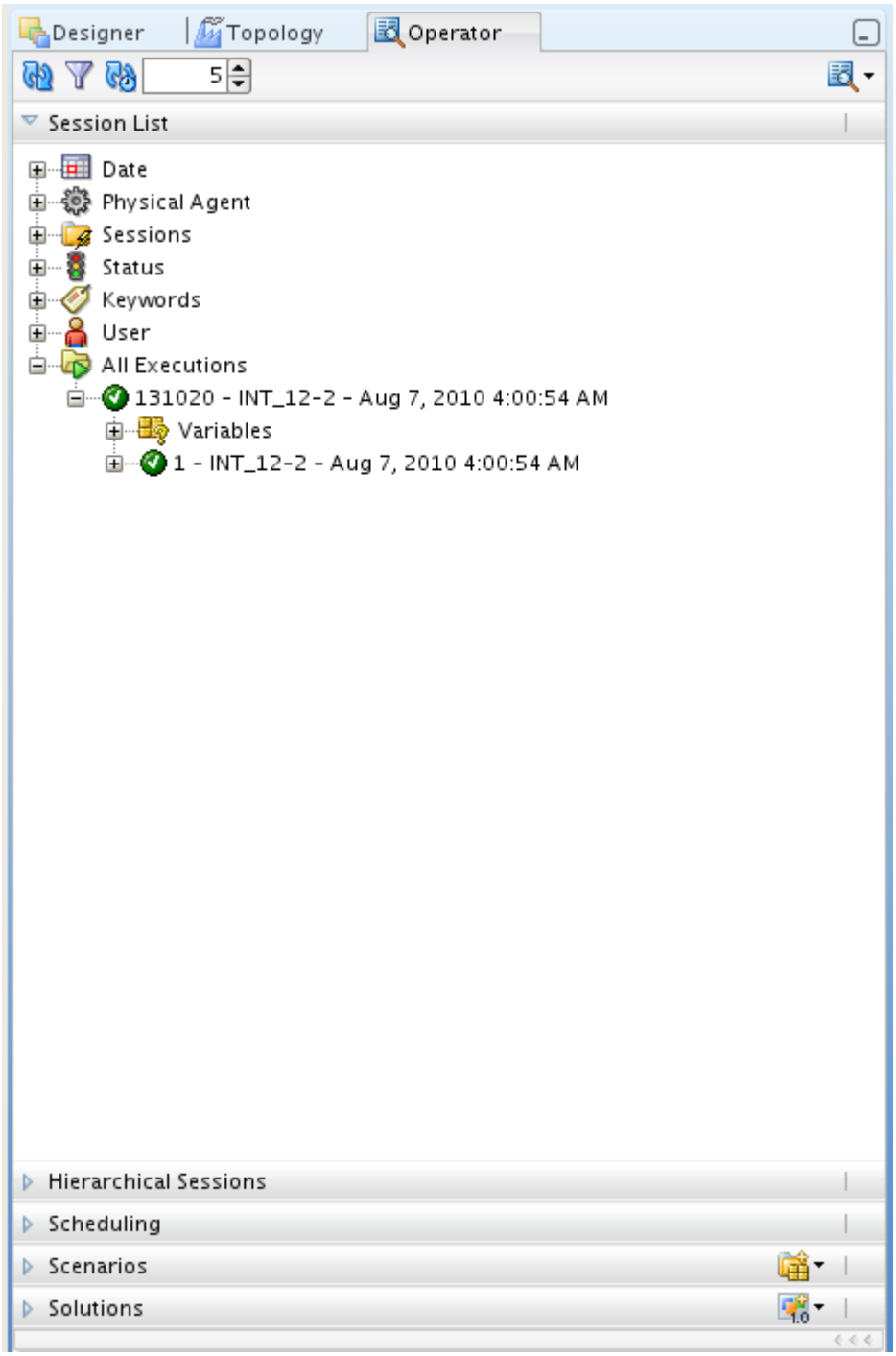


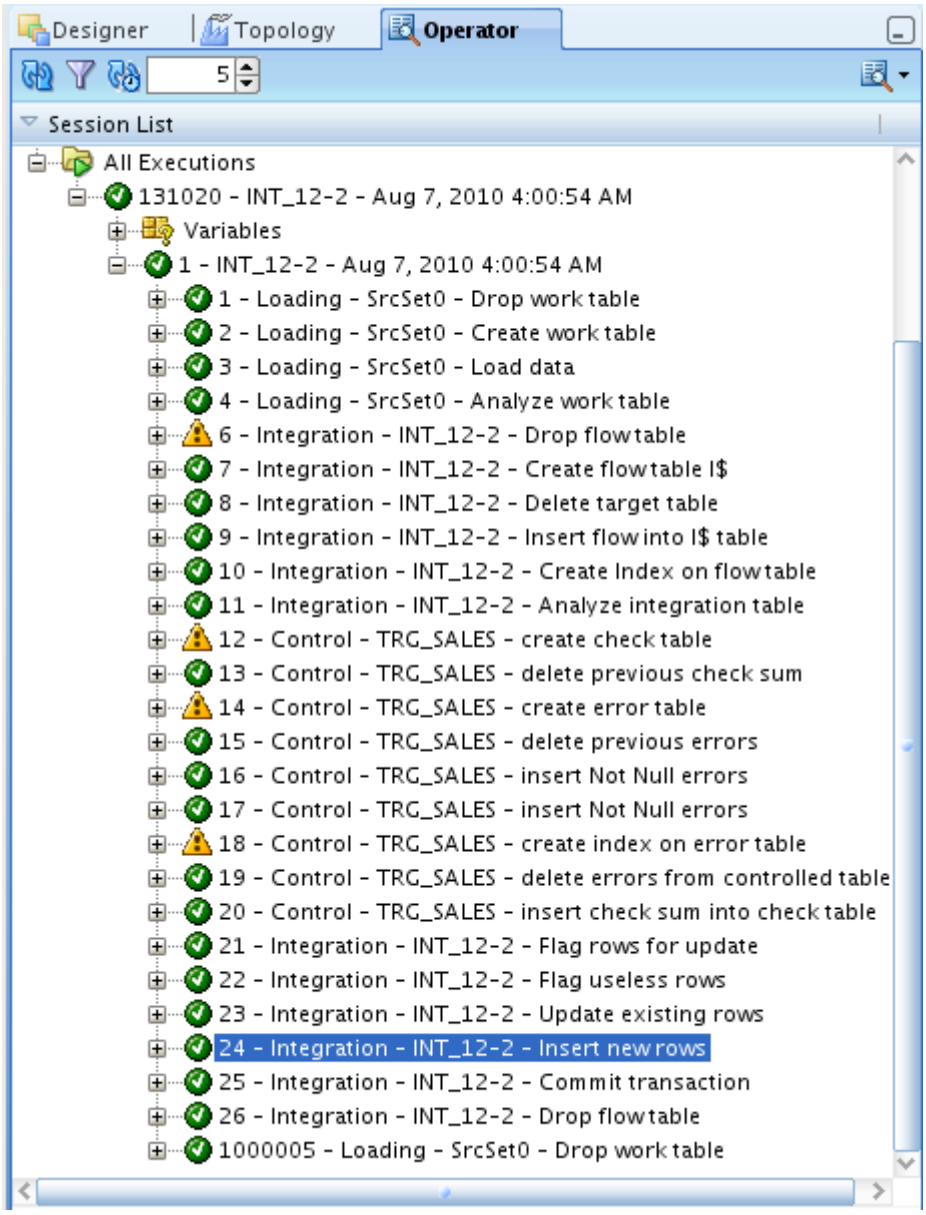
4) Execute interface INT_12-2 and verify execution results.

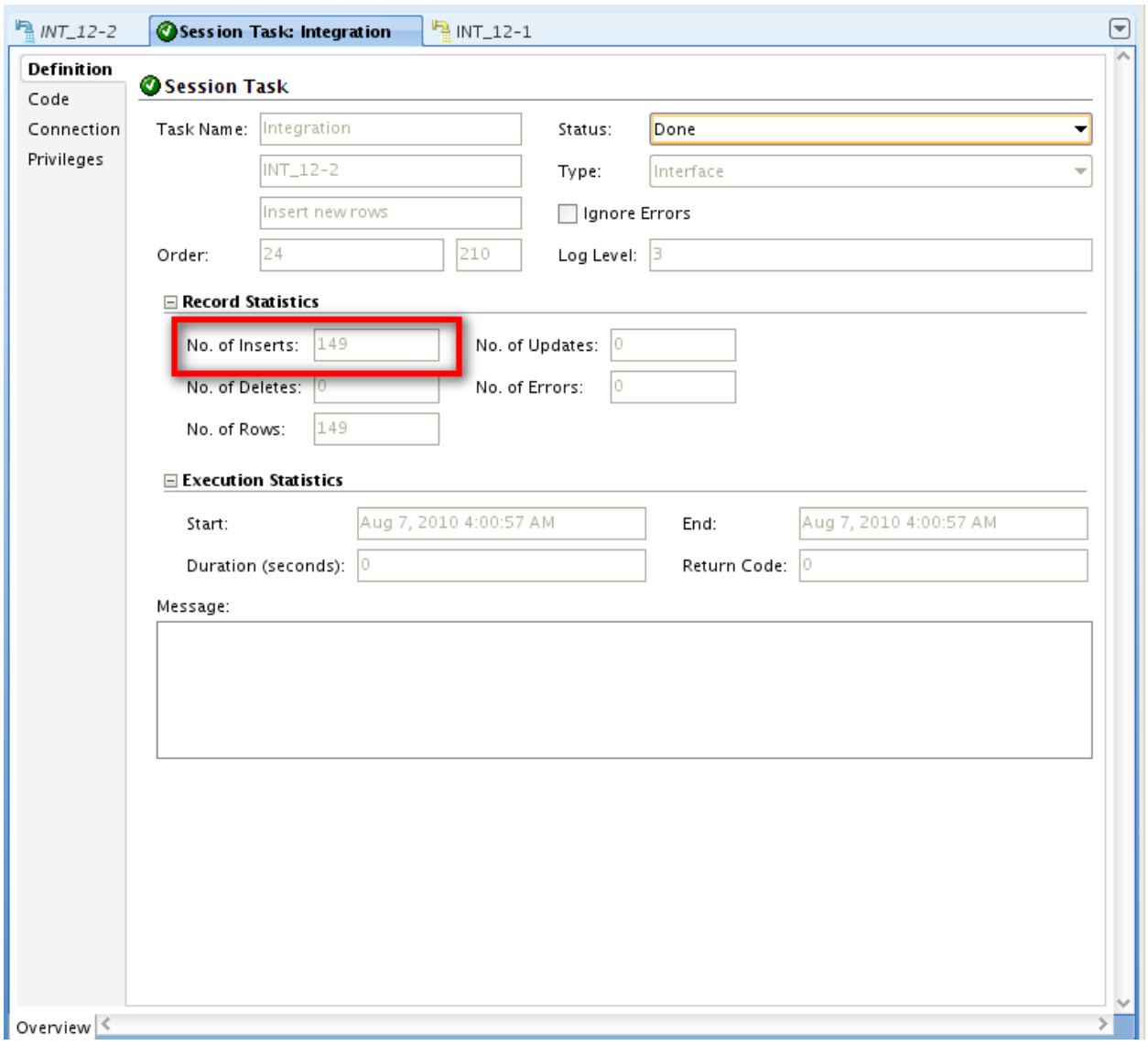
a) Execute interface INT_12-2.



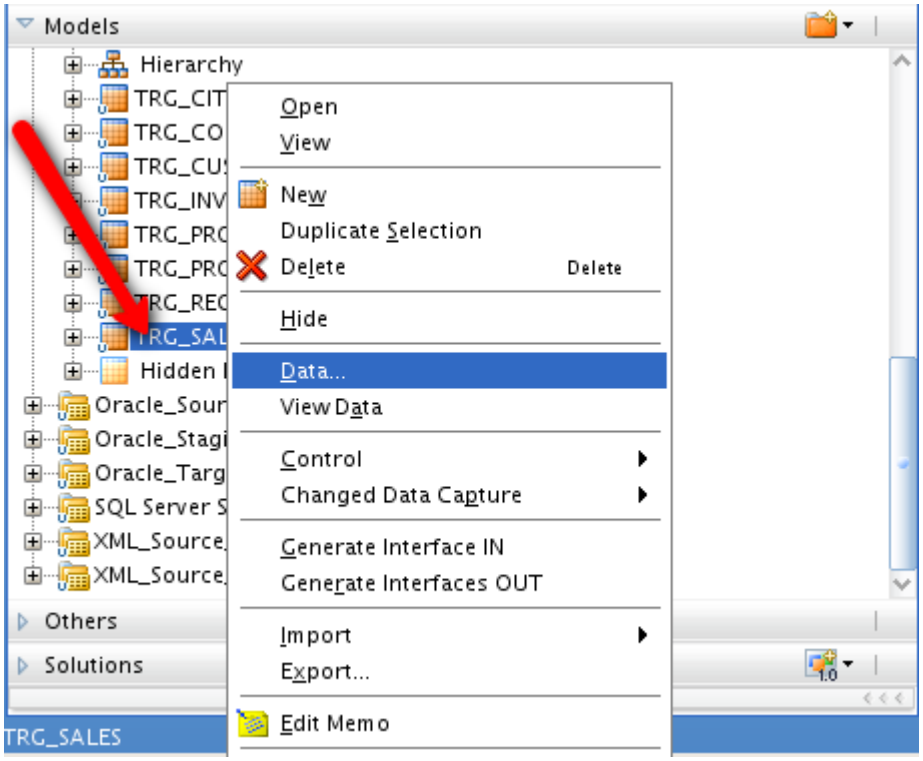
b) Open ODI Operator Navigator and verify that interface INT_12-2 executed successfully. Scroll down and open the task Integration- INT_12-2 – Insert new rows. Verify number of inserts.



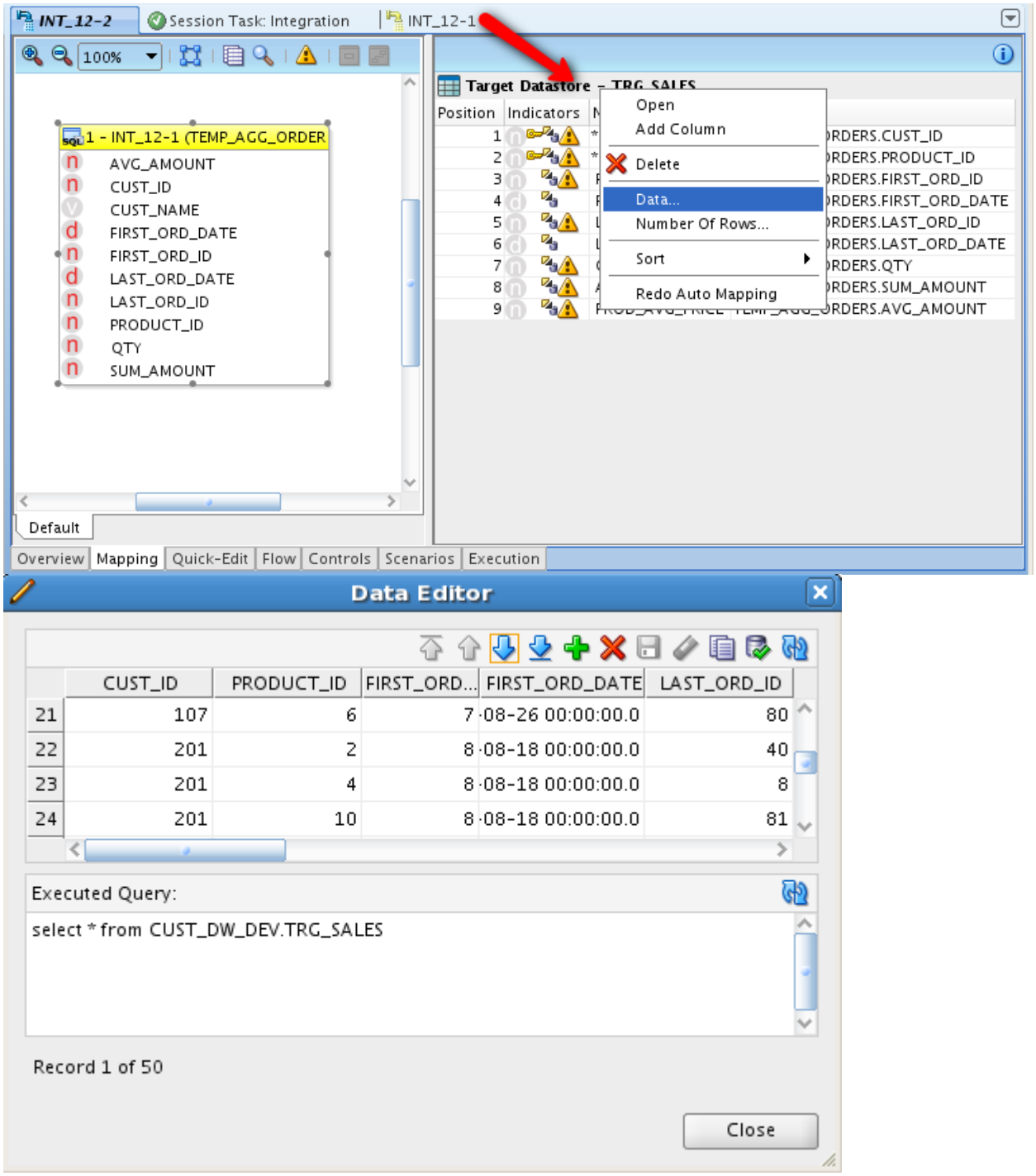

Designer
Topology
Operator
5
Session List
All Executions
131020 - INT_12-2 - Aug 7, 2010 4:00:54 AM
Variables
1 - INT_12-2 - Aug 7, 2010 4:00:54 AM
1 - Loading - SrcSet0 - Drop work table
2 - Loading - SrcSet0 - Create work table
3 - Loading - SrcSet0 - Load data
4 - Loading - SrcSet0 - Analyze work table
6 - Integration - INT_12-2 - Drop flow table
7 - Integration - INT_12-2 - Create flow table I$
8 - Integration - INT_12-2 - Delete target table
9 - Integration - INT_12-2 - Insert flow into I$ table
10 - Integration - INT_12-2 - Create Index on flow table
11 - Integration - INT_12-2 - Analyze integration table
12 - Control - TRG_SALES - create check table
13 - Control - TRG_SALES - delete previous check sum
14 - Control - TRG_SALES - create error table
15 - Control - TRG_SALES - delete previous errors
16 - Control - TRG_SALES - insert Not Null errors
17 - Control - TRG_SALES - insert Not Null errors
18 - Control - TRG_SALES - create index on error table
19 - Control - TRG_SALES - delete errors from controlled table
20 - Control - TRG_SALES - insert check sum into check table
21 - Integration - INT_12-2 - Flag rows for update
22 - Integration - INT_12-2 - Flag useless rows
23 - Integration - INT_12-2 - Update existing rows
24 - Integration - INT_12-2 - Insert new rows
25 - Integration - INT_12-2 - Commit transaction
26 - Integration - INT_12-2 - Drop flow table
1000005 - Loading - SrcSet0 - Drop work table


INT_12-2
Session Task: Integration
INT_12-1
Definition
Code
Connection
Privileges
Session Task
Task Name: Integration
Status: Done
INT_12-2
Type: Interface
Insert new rows
Ignore Errors
Order: 24 210
Log Level: 3
Record Statistics
No. of Inserts: 149
No. of Updates: 0
No. of Deletes: 0
No. of Errors: 0
No. of Rows: 149
Execution Statistics
Start: Aug 7, 2010 4:00:57 AM
End: Aug 7, 2010 4:00:57 AM
Duration (seconds): 0
Return Code: 0
Message:
Overview

c) In the Models tab in Oracle Sales Warehouse model, right-click TRG_SALES datastore, and select View Data. View rows inserted in the target datastore.



As an alternative, right-click the target datastore and select Data…


INT_12-2
Session Task: Integration
INT_12-1
100%
1 - INT_12-1 (TEMP_AGG_ORDER
AVG_AMOUNT
CUST_ID
CUST_NAME
FIRST_ORD_DATE
FIRST_ORD_ID
LAST_ORD_DATE
LAST_ORD_ID
PRODUCT_ID
QTY
SUM_AMOUNT
Target Datastore – TRG_SALES
Position
Indicators
Open
Add Column
Delete
Data...
Number Of Rows...
Sort
Redo Auto Mapping
Default
Overview
Mapping
Quick-Edit
Flow
Controls
Scenarios
Execution
Data Editor
CUST_ID
PRODUCT_ID
FIRST_ORD...
FIRST_ORD_DATE
LAST_ORD_ID
21 107 6 7 08-26 00:00:00.0 80
22 201 2 8 08-18 00:00:00.0 40
23 201 4 8 08-18 00:00:00.0 8
24 201 10 8 08-18 00:00:00.0 81
Executed Query:
select * from CUST_DW_DEV.TRG_SALES
Record 1 of 50
Close

Lab 13: Change Data Capture with ODI

Introduction

Changed Data Capture (CDC), also referred to as *Journalizing*, allows you to trap changes occurring on the source data. CDC is used in Oracle Data Integrator to eliminate the transfer of unchanged data. This feature can be used for example for data synchronization and replication. Journalizing can be applied to models, sub-models or datastores based on certain type of technologies.

Changed Data Capture is performed by journalizing models. Journalizing a model consists of setting up the infrastructure to capture the changes (inserts, updates and deletes) made to the records of this model's datastores.

Oracle Data Integrator supports two journalizing modes:

- Simple Journalizing tracks changes in individual datastores in a model.
- Consistent Set Journalizing tracks changes to a group of the model's datastores, taking into account the referential integrity between these datastores. The group of datastores journalized in this mode is called a **Consistent Set**.

Process Overview

A common task that is performed using ODI is to implement Changed Data Capture. In this practice, students implement Changed Data Capture to detect changes in the source environment for the interface. You will capture changes of data in the SRC_CITY table in MYSQL DataSource model. Then, you modify the interface to process changed records only.

In this practice, you perform changed data capture in an interface, using the JKM MySql Simple knowledge module.

Below are the steps that have been completed:

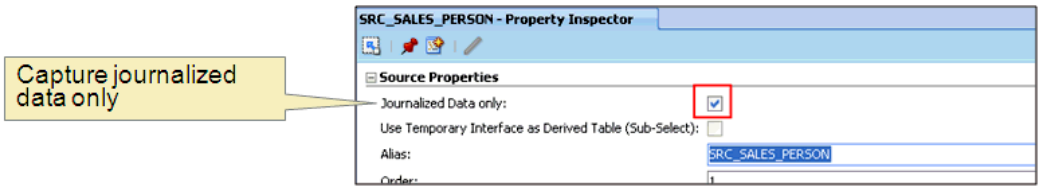
1. Import the JKM MySql Simple knowledge module.
2. Create a model Oracle CDC Source, specifying this knowledge module in the Journalizing tab.
3. Reverse engineer the model, verifying the resulting structure.

Below are the steps that have to be completed:

1. Add the models' SRC_CITY table to CDC, and start the Journal using the default subscriber SUNOPSIS.

2. Use Data viewer to change data in the table and verify in Journal Data, that the data change was captured.

3. Create am interface to process changed data only.

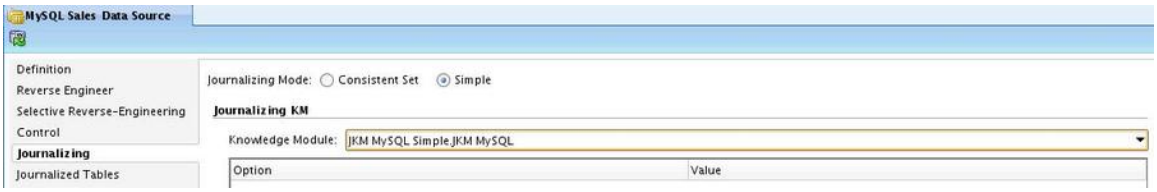


Scenario

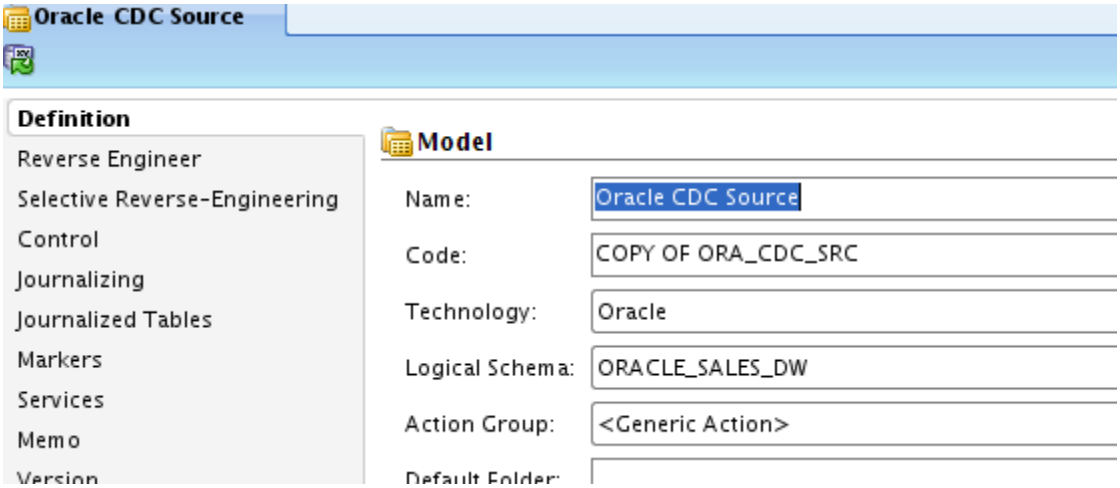
As a database administrator you are responsible for data loading, transformation, and validation. You want to be able to detect changes in your source environment. For that purpose you need to implement Changed Data Capture to your data integration project.

Instructions

1) Open the MYSQL Sales DataSource from the Model tab. Verify if the Journalizing is set to Simple and has the corresponding Knowledge Module. If not set the mode to simple. Select JKM MySQL Knowledge Module as shown.

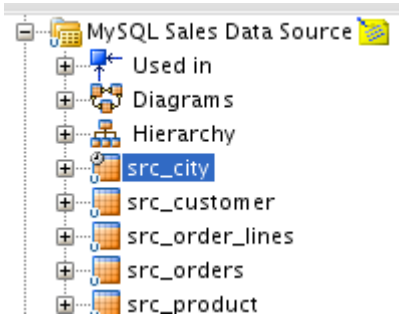


2) Open the Oracle CDC Source from the Model tab. Select the logical schema as ORACLE_SALES_DW. Go to Reverse Engineer tab and select the context as Development and save the model.



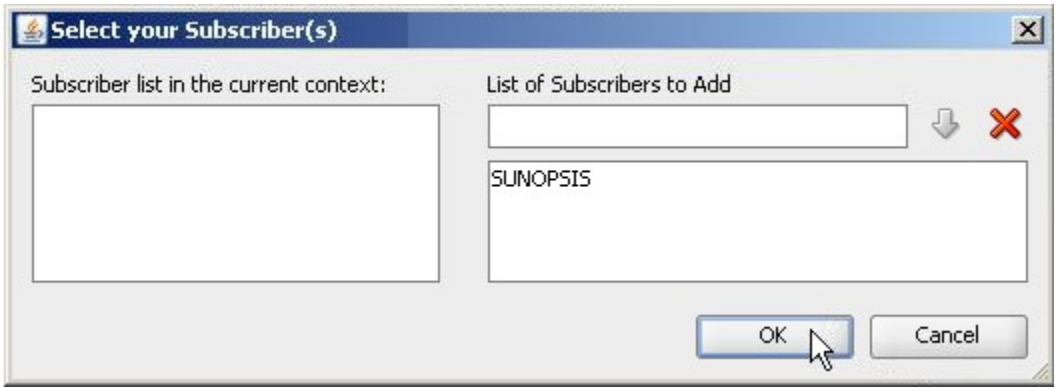
3) Set up the CDC Infrastructure. You will start the CDC on the SRC_CITY table in MYSQL Sales DataSource model.

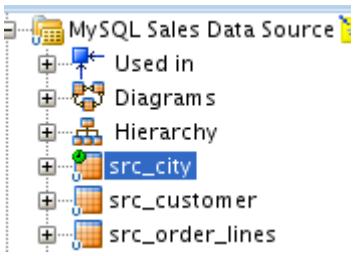
a) To add the table to CDC, expand the MYSQL Sales DataSource model, right-click the SRC_CITY table and select Change Data Capture > Add to CDC. Click Yes to confirm.



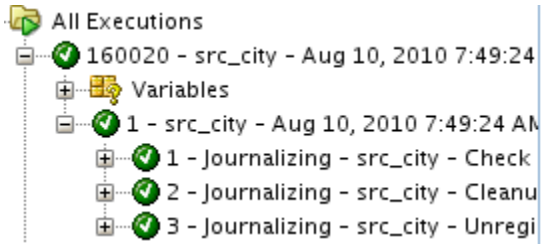
b) Click the Refresh  icon. The small yellow clock icon is added to the table. Right-click SRC_CITY table again and select Changed Data Capture > Start Journal.

c) In this practice, you use the default subscriber SUNOPSIS. For that reason, you do not have to add another subscriber. Click OK to confirm that your subscriber is SUNOPSIS. Click OK. In the Information window, click OK again. Click Refresh  and verify that the tiny clock icon at SRC_CITY table is green now. This means that your journal is properly started.





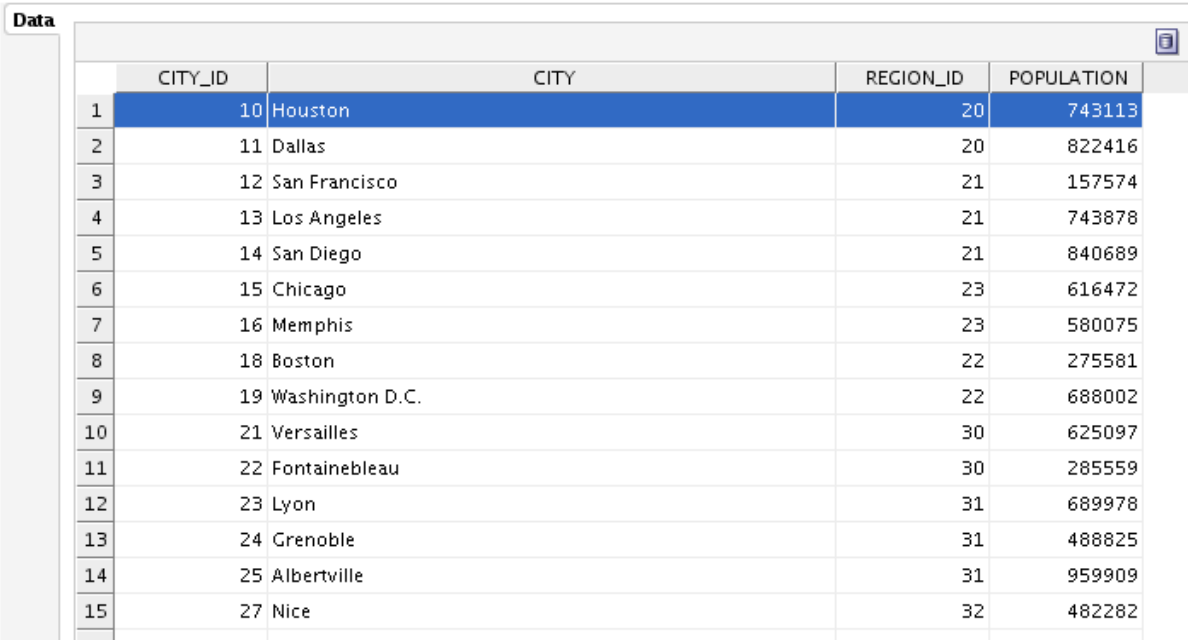
d) Click the ODI Operator icon to open the Operator. Click Refresh. Select All Executions and verify that the SRC_CITY session executed successfully.



4) View data and changed data.

a) In the Designer window, open models tab. Right-click the SRC_CITY datastore and select Data.

b) Select the row with CITY_ID = 11. Change the value of the Population column to “122345”. Select the row with CITY_ID = 22. Change the value of the CITY column to “PHOENIX”. Similarly, select the row with CITY_ID = 27, and then change the REGION_ID to “23”. Save your changes and close the tab.


Data

	CITY_ID	CITY	REGION_ID	POPULATION
1	10	Houston	20	743113
2	11	Dallas	20	822416
3	12	San Francisco	21	157574
4	13	Los Angeles	21	743878
5	14	San Diego	21	840689
6	15	Chicago	23	616472
7	16	Memphis	23	580075
8	18	Boston	22	275581
9	19	Washington D.C.	22	688002
10	21	Versailles	30	625097
11	22	Fontainebleau	30	285559
12	23	Lyon	31	689978
13	24	Grenoble	31	488825
14	25	Albertville	31	959909
15	27	Nice	32	482282

c) Right-click the table again and select View Data. Scroll down, and verify that the rows are modified. Close the tab.

d) To verify that your changed data is captured, right-click SRC_CITY, and select Change Data Capture > Journal Data. Find the captured changed records in the journal data. Close the tab. You should see three records

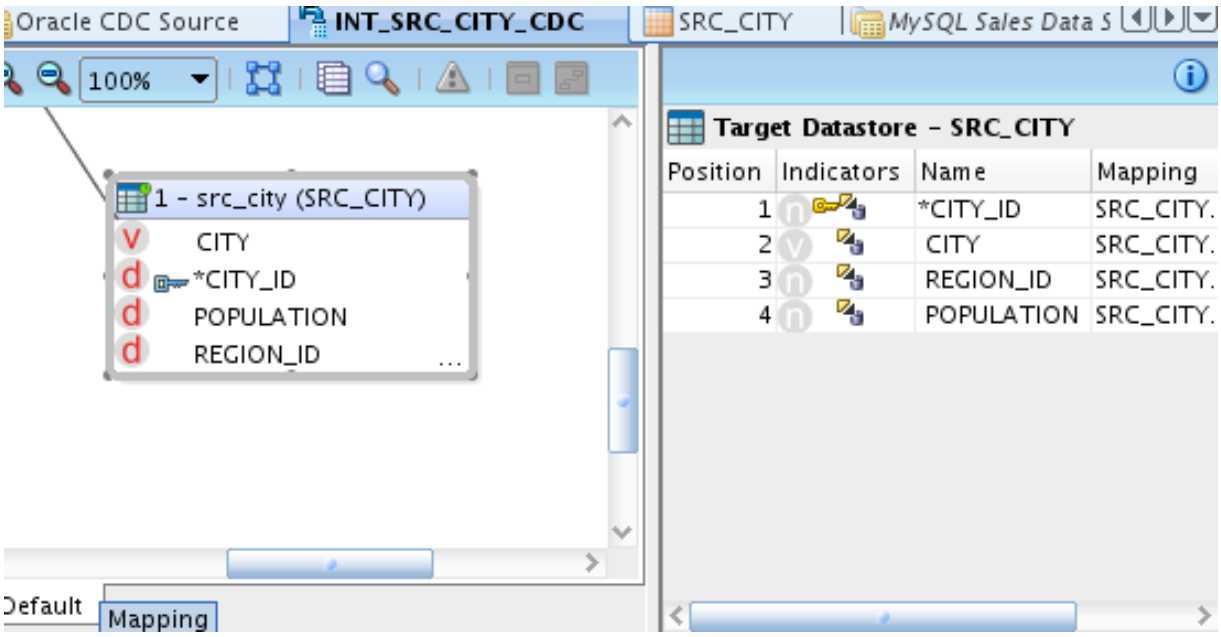
5) Create an interface that processes captured data changes. The interface loads the SRC_CITY datastore in the Oracle CDC Source model with the content of the SRC_CITY table from the MYSQL Sales DataSource model. The purpose of this interface is to process and load only changed data.

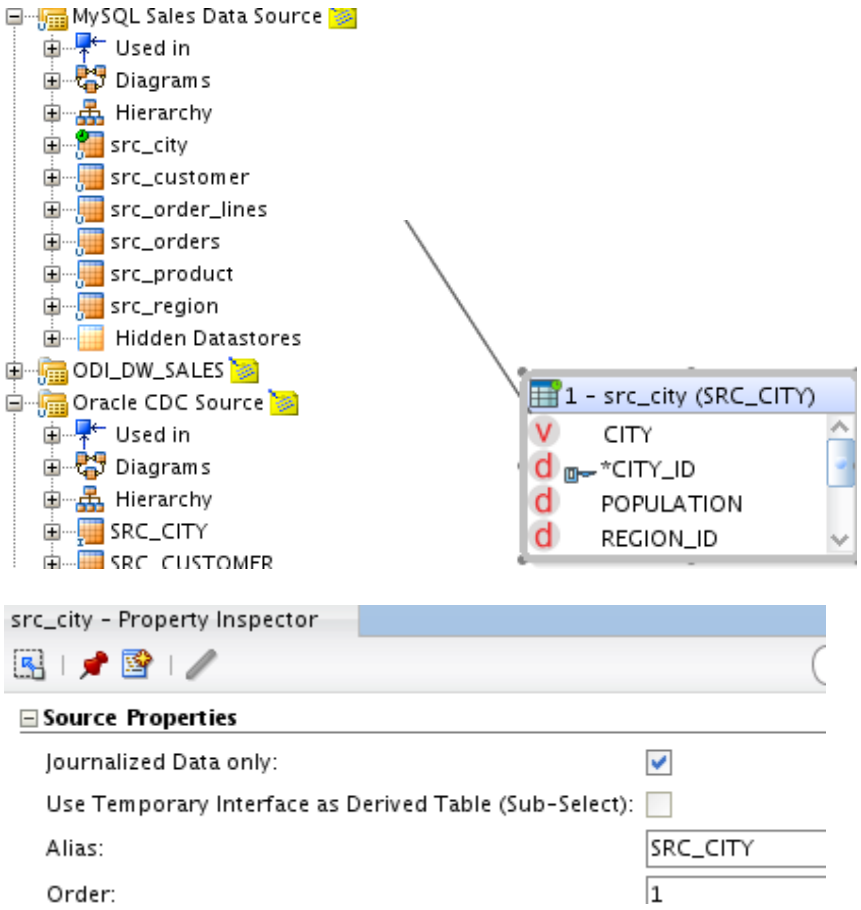
a) In the Projects tab, expand Lesson -13 CDC> HandsOn > Interfaces. Right-click Interfaces, and then select New Interface.

b) In the Interface: NEW window, enter INT_SRC_CITY_CDC as the name of the interface. Ensure that the Optimization Context is Development. Click the Mapping tab.

c) Open the Models tab. In the tree view, expand the Oracle CDC Source model. Drag the SRC_CITY datastore from the tree view to the Target Datastore zone.

Expand the MYSQL Sales DataSource model and drag the SRC_CITY datastore from the model tree to the Sources zone of your diagram. Click Yes to perform Automatic Mapping. Click the SRC_CITY (Source) datastore, and then select Journalized Data Only checkbox. Save you interface.





d) Right-click the caption of source datastore and select Data. Scroll down to preview the current source data. Close the Data window.

e) Click Flow tab, click the Staging Area caption and verify that selected IKM is IKM Oracle Incremental Update. Select Distinct Rows.

f) Save you interface and close the tab. Execute the interface to process only journalized records.

6) Verify the execution results.

a) Open the Operator. Click Refresh. Expand the All Executions node and verify that you session INT_SRC_CITY_CDC executed successfully.

b) View data from model SRC_CITY Oracle CDC data store and verify that only three changed rows are updated in the target datastore.

7) In the Models tab, right-click SRC_CITY MYSQL Sales DataSource datastore and select Drop Journal. Click OK, and then click OK again. Right-click SRC_CITY datastore again, and then select Remove from CDC.

Lab 14: Version, Solution and Migration

Introduction

Oracle Data Integrator provides a comprehensive system for managing and safeguarding changes. The version management system allows **flags** on developed objects (such as projects, models, etc) to be automatically set, to indicate their status, such as new or modified. It also allows these objects to be backed up as stable checkpoints, and later restored from these checkpoints.

A **version** is a backup copy of an object. It is checked in at a given time and may be restored later. Versions are saved in the Master repository. The following objects in ODI can be versioned: Projects, Folders, Packages, Interfaces, Procedures, Sequences, Variables, User Functions, Models, and Solutions. Creating a version creates the XML definition of the object, and then stores it in compressed form in the Master repository version tables. Versions can then be restored into any connected Work repository. ODI provides a Version Browser to display versions. Versions of ODI objects can be compared by using the Version Comparison Tool.

A **solution** is a comprehensive and consistent set of interdependent versions of objects. Like other objects, it can be checked in at a given time as a version, and may be restored at a later date. Solutions are saved into the master repository. A solution assembles a group of versions called the solution's **elements**. A solution is automatically assembled using cross-references. By scanning cross-references, a solution automatically includes all dependent objects required for a particular object. You can also manually add or remove elements into and from the solution. The following objects may be added into solutions: Projects, Models, Scenarios, Global Variables, User Functions and Sequences.

Another important aspect of organizing and managing integration projects is the ability to **import** and **export** objects to share them with other projects. Exporting and importing Oracle Data Integrator objects means transferring objects between different repositories. Oracle Data Integrator uses internal identifiers (ID) to ensure object uniqueness across several work repositories. Oracle Data Integrator stores all objects in a relational database schema (the Repository) with dependencies between objects. Repository tables that store these objects maintain these dependencies as references using the IDs. Because object IDs are transferred as part of the export and import process, you need to understand the implications of the operation you are performing. Using solutions and

versioning is the recommended way of maintaining the dependencies automatically when doing export/import.

Prerequisites

Completion of **Lab 4-1: Creating Master and Work Repository**.

Process Overview

ODI provides easy to use built in version control and solution management mechanism to manage the ODI objects. In typical development cycle, developers will be uploading ODI projects/scenarios to the work repository. Developer and/or admin can version the projects or can create solutions to group related objects to better version control the solutions. This allows for easy management of ODI metadata for version control and migration.

In this practice, you will experience simple version creation of ODI project, create solution to understand grouping of objects, view version control reports and, perform simple import/export.

For this lab you can use any of the previously completed projects and perform activities mentioned for this lab. We will use *PTS Lab 03 – Building First Interface – Solved* as an example.

Below are the steps that have to be completed for this lab

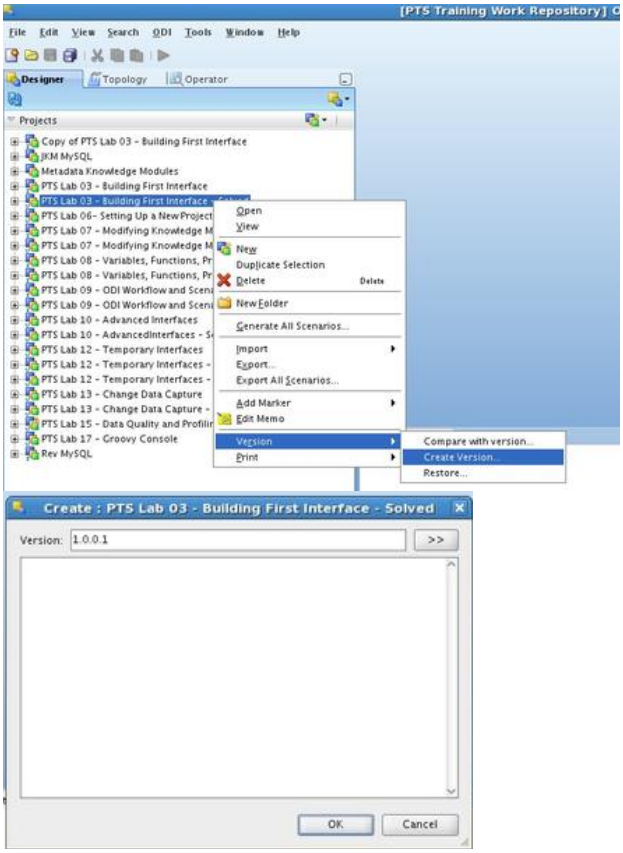
- Create New Version for the project
- Create New Solution to group the related objects for the project
- View version comparison report
- Export and import Operation.

Scenario

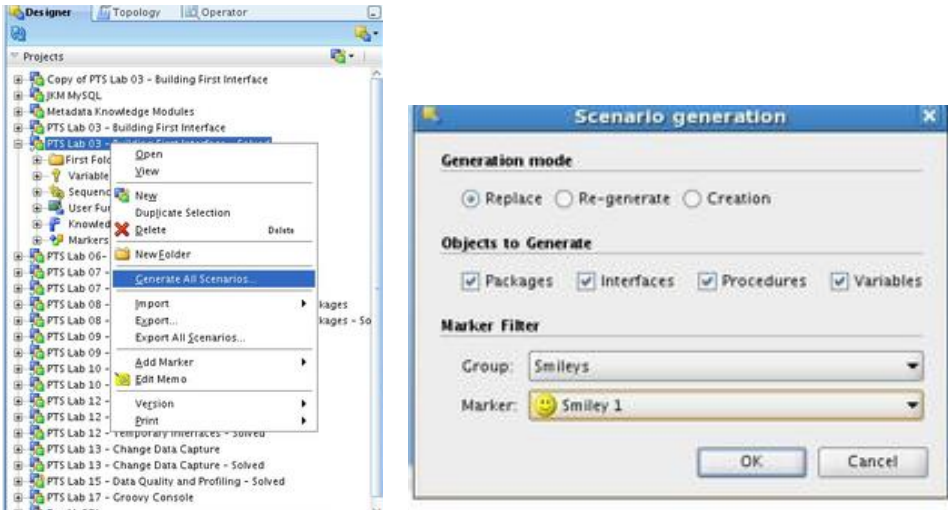
As a Data Integration Lead, you are also responsible for managing ODI project and versioning ODI objects for migration purposes as well managing the development to production cycle. You want to be able to track changes to ODI objects, version them and migrate them in a manageable group of objects.

Instructions

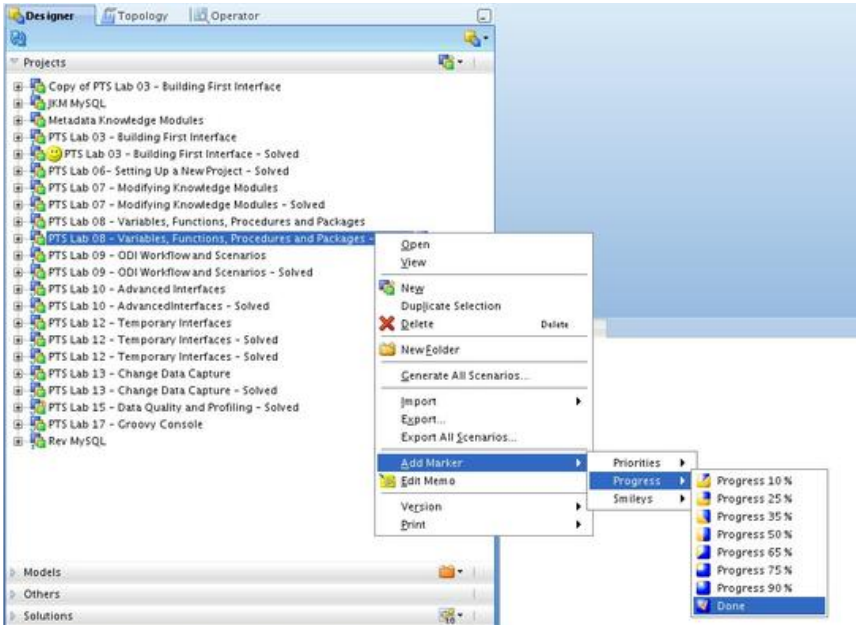
1) Right Click on Project and select Version -> Create Version Menu. A Version Creation window will show up. One can explicitly provide version number based on development standard of the projects or can continue with system provided versions. We will use auto generated version number for the lab. Click OK with default version number.



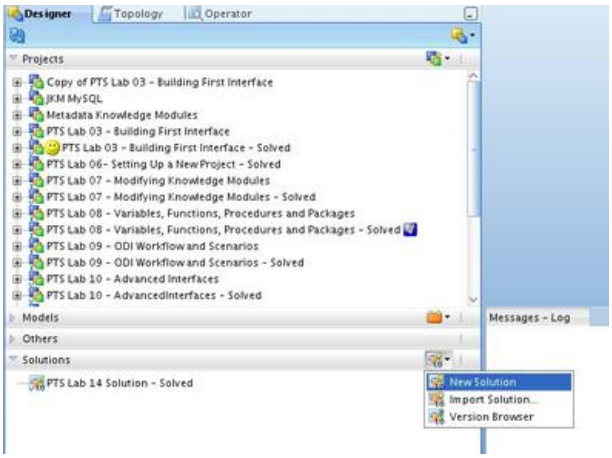
2) Generate all scenarios by right clicking on the project and selecting Generate All Scenarios. You can keep 'Replace' as a Generation Mode and keep all objects selected as part of scenario. A new feature is enabled to provide better grouping and search option for the metadata within ODI. You can select Group Smileys and Marker as Smiley 1. Click OK.



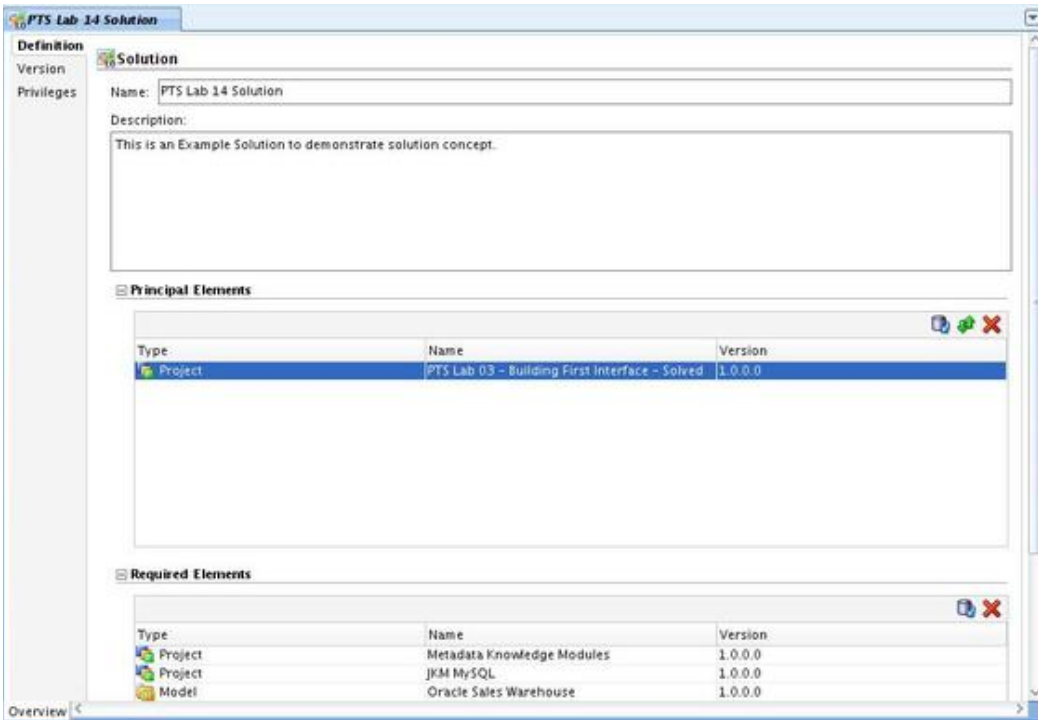
Note: Markers may not display this way. You can also add marker by right clicking on objects. See example below and add markers to couple of projects to see them ☺.



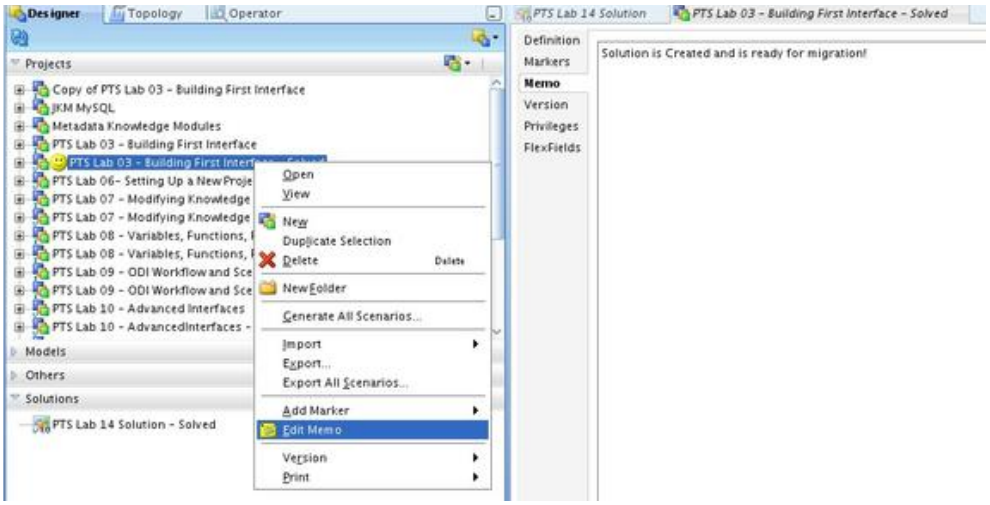
3) We will create Solution to group all the related objects for project PTS Lab 03 so that when we migrate solution to different repository, model, KM, interface, etc. will all move together. Expand Solutions section from left pane and click on icon to create new Solution.

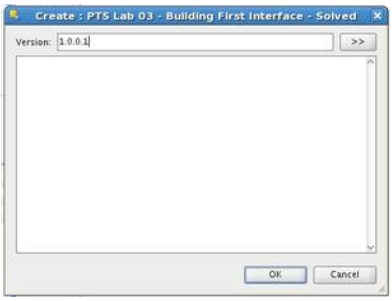


On Definition tab for Solution, give it a name PTS Lab 14 Solution. Drag a PTS Lab 03 –Building First Interface Project from project pane and drop it on the right side within Principal Elements section. You will see how all related objects are automatically imported into solution's Required Elements section. You can also add more components if needed as a part of solution. Click Save All to save your solution.

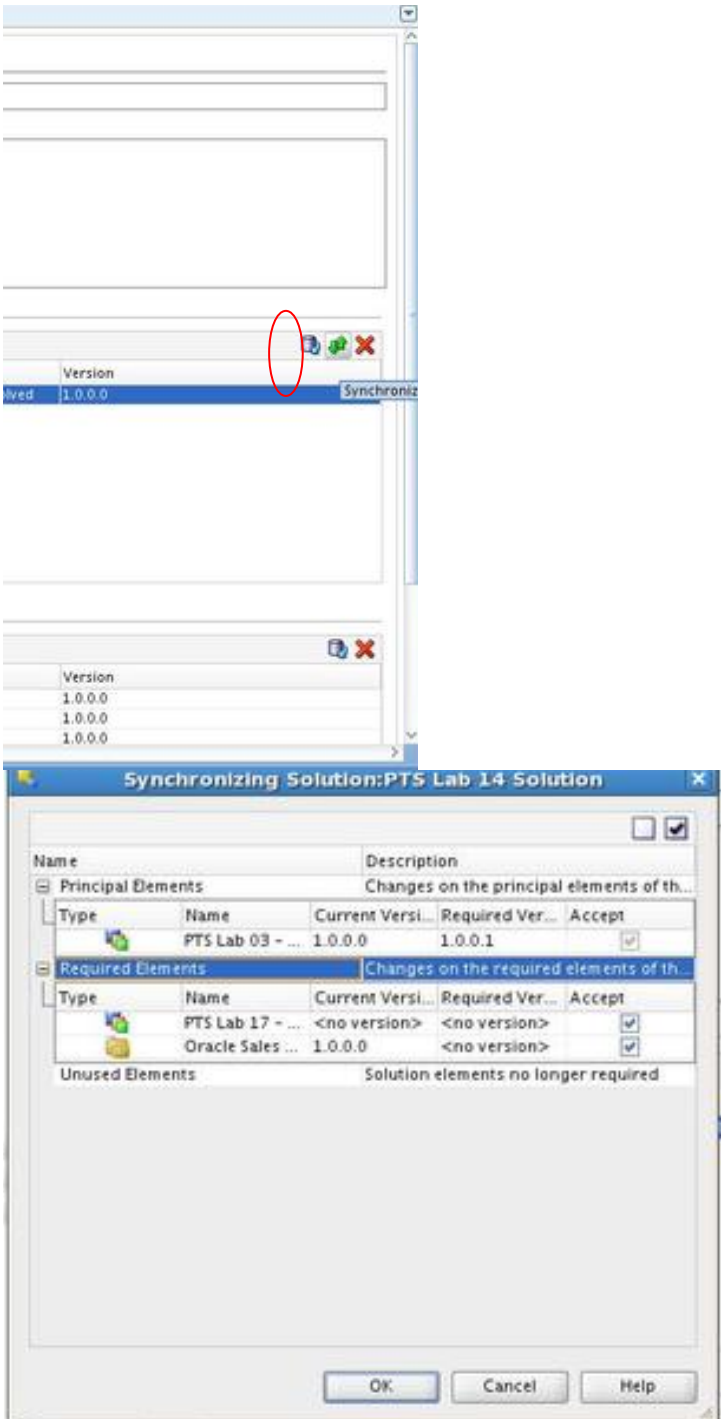


4) Update Lab 3 with notes and create new version. Right click in PTS Lab 3 on project and Edit Memo. Enter Some description on the right side memo box: 'Solution is created and ready for migration!'. Save all your changes. Generate new version for the Project.

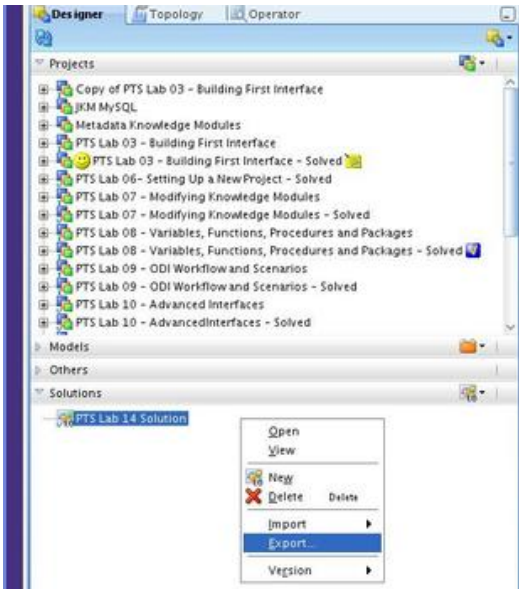


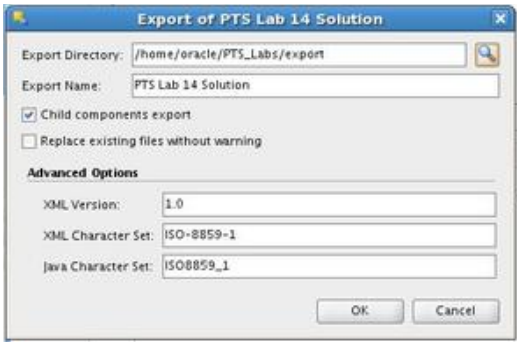


5) Open your Lab 14 Solution if not already open. Click on synchronize button to update solution with new project version. You will be shown synchronizing update window to verify the changes. Click OK. You should see new project version for Principal Elements section.



6) We will export solution and import it into different repository. Right click in solution and select export. Select /home/oracle/PTS_Labs/export as export directory and click OK for the export wizard.

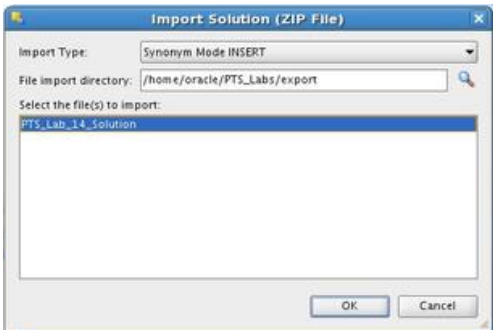




Export zip file will be saved into specified directory. You can verify that from terminal window. Alternatively, you can double-click Oracle's home folder on the Desktop, then drill down from PTS_Labs to open up export folder to see contents.

7) Disconnect from current repository and log into work repository you created as a part of Lab 4. Go to solution section and select Import Solution. Make sure you have /home/oracle/PTS_Labs/export directory selected and then select the Lab 14 Solution, click OK.


Models
Others
Solutions
New Solution
Import Solution...
Version Browser


Import Solution (ZIP File)
Import Type:
Synonym Mode INSERT
File import directory:
/home/oracle/PTS_Labs/export
Select the file(s) to import:
PTS_Lab_14_Solution
OK
Cancel

Lab 15: Data Quality and Profiling

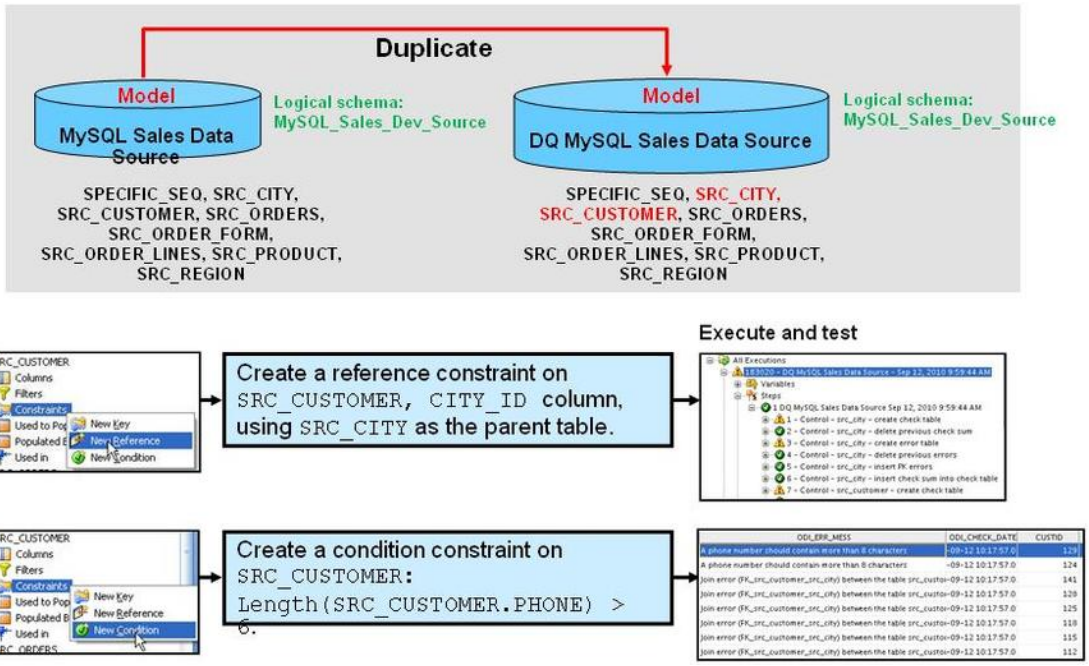
Introduction
Data Quality control is essential in ensuring the overall consistency of the data in your information system's applications. Quality control can happen before data is integrated, when it is called **flow control**. It can also happen after the integration, on the datastores, when it is called **static control**.

In either case, the data is checked against a set of constraints you have defined. These are similar to database constraints: primary keys, foreign keys, and data conditions. If the data does not pass the quality control, it is moved to a separate table. You can then review and fix the problems in ODI, and recycle the data through the interface.

Process Overview

Once the models are defined, you need to check the quality of the data in these models. In this practice, you check the quality of data in the models and define constraints on models for the given sample application.

Note: Completing this practice is critical for all the following practice sessions.



Lab 15.1: Enforcing Data Quality in the Model (on the Source)

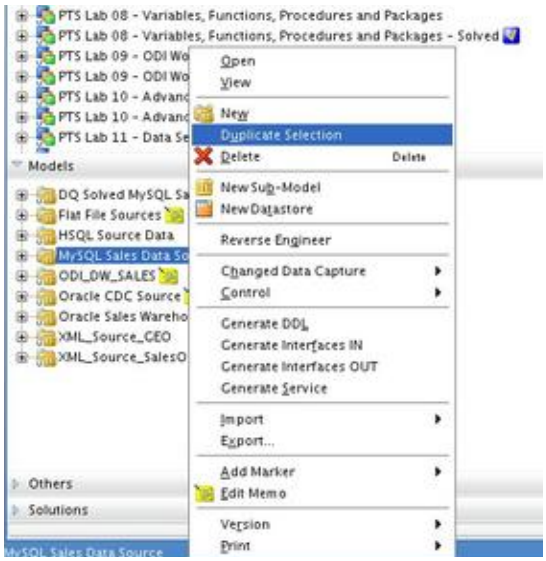
Scenario

You created new ODI Models and reverse engineered all tables and files in the models. Now, you need to check the quality of data in the models, define the constraints on the models, and detect possible errors in data.

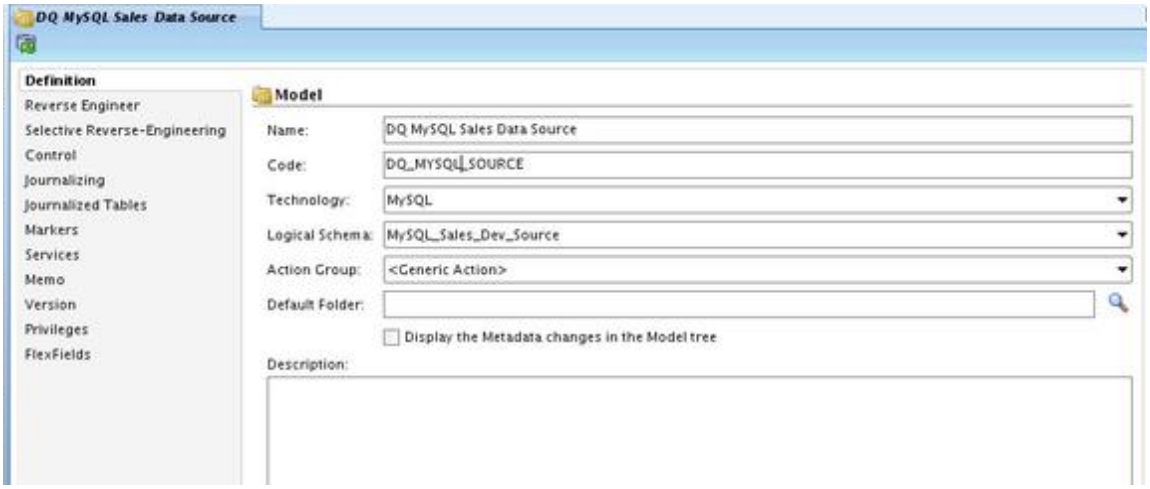
Instructions

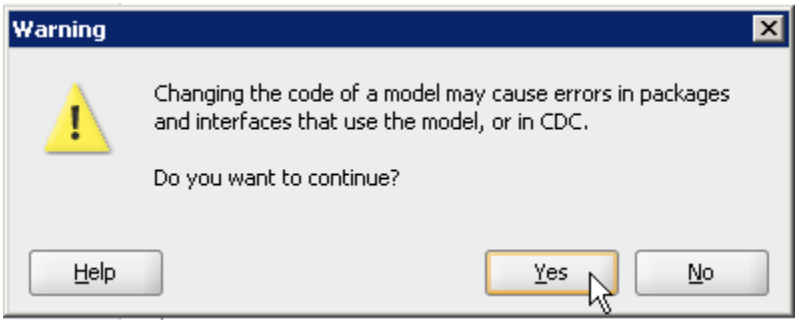
1) Create a Reference constraint between the SRC_CUSTOMER and SRC_CITY datastores in a new Orders Application model. This reference is on the CITY_ID column.

a) In Designer, open the Models tab. Right-click MySQL Sales Data Source model and select Duplicate selection to duplicate the datastore. Click Yes.

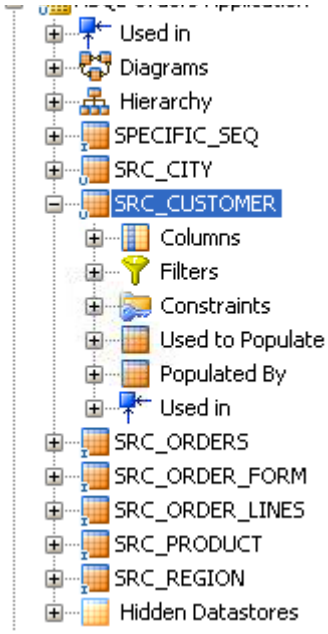


2) Open the Copy of MySQL Sales Data Source model and rename it as DQ MySQL Sales Data Source. For Code, enter DQ_MYSQL_SOURCE. Click Save to save the model. If you get a warning message, click Yes to finish saving.



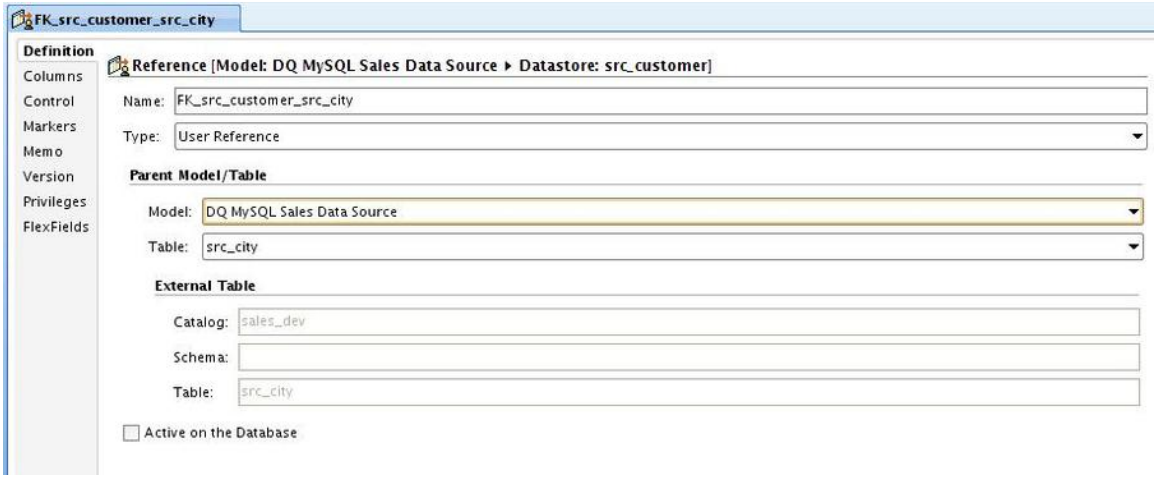


a) Expand the DQ MySQL Sales Data Source model, and expand the SRC_CUSTOMER datastore.

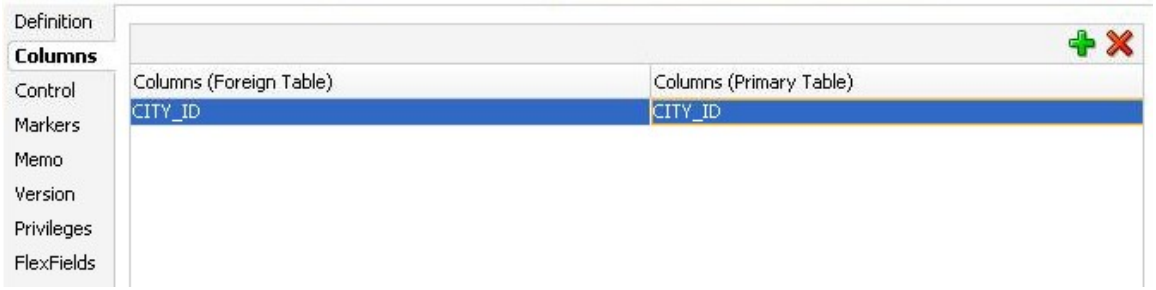


b) Select the Constraints node, right-click and select the New Reference option.

c) From the Table drop-down list, select the SRC_CITY table. The name of the constraint is automatically generated.

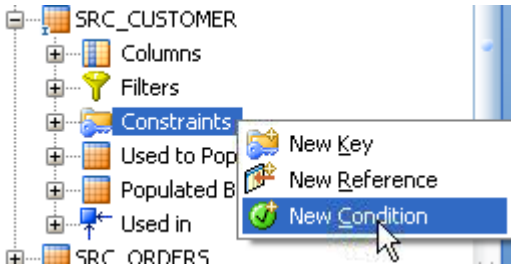


d) Click the Columns tab. Click the Add icon, and use drop-down lists to select the CITY_ID column for both tables of reference. (Note that the Primary Table column is City, which you want to also change to CITY_ID.) Click the Save button.



3) Create a Condition constraint on SRC_CUSTOMER to check that the phone number contains nine or more characters.

a) Select the Constraints node again for SRC_CUSTOMER, right-click and select the New Condition option.



b) Enter “Phone Number Length” in the Name field.

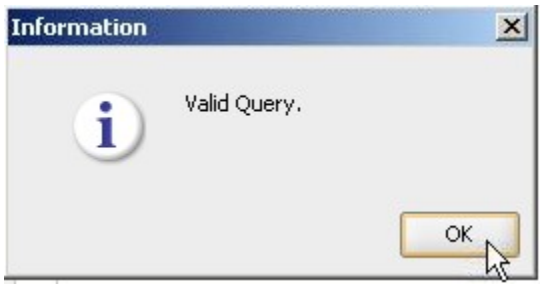
c) Select Oracle Data Integrator Condition from the Type drop-down list.

d) Enter the following expression in the Where field: LENGTH(SRC_CUSTOMER.PHONE) > 8. In the Message field, enter “A phone number should contain more than 8 characters”.

Note: You can also use the Expression Editor icon to graphically edit this expression.

e) Click the Validation icon to validate your expression syntax.

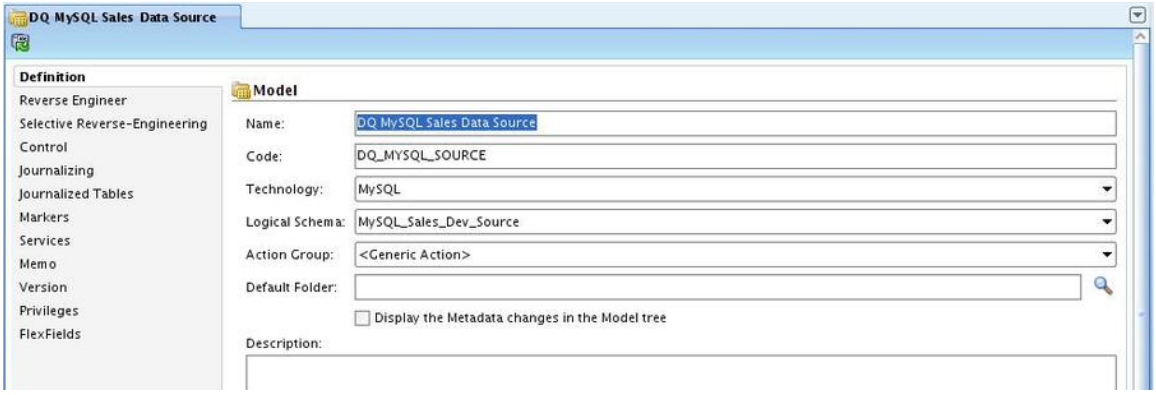
f) On Oracle Data Integration Information screen, click OK.

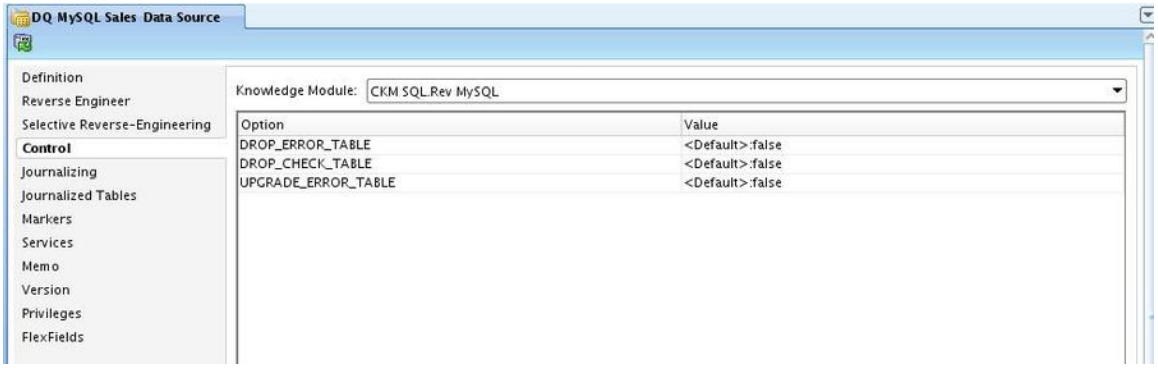


g) Click Save button to add the condition, and the close the tab.

4) Run a static check on the DQ MySQL Sales Data Source model.

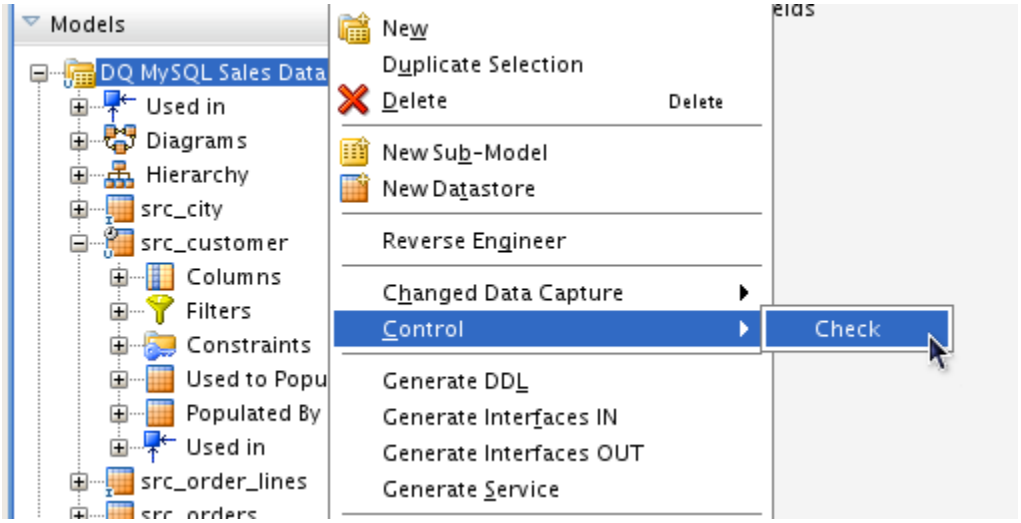
a) Open DQ MySQL model, click Control tab and select Knowledge Module CKM SQL Rev MySQL. Click Save button. Close DQ MySQL Sales Data Source model tab.



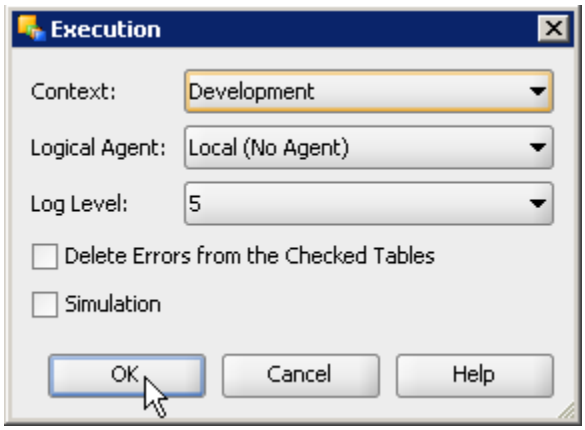


b) Select the DQ MySQL Sales Data Source model in the tree view, right-click and select Control > Check.

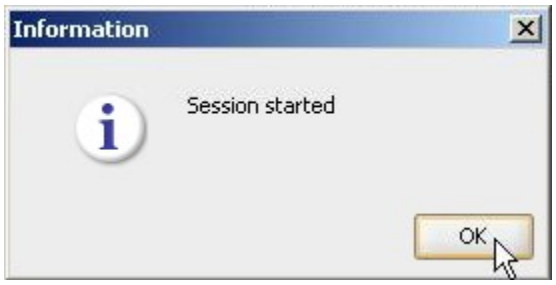
c)

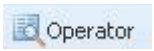


d) In the Execution dialog box that appears, select Development context and then click OK.

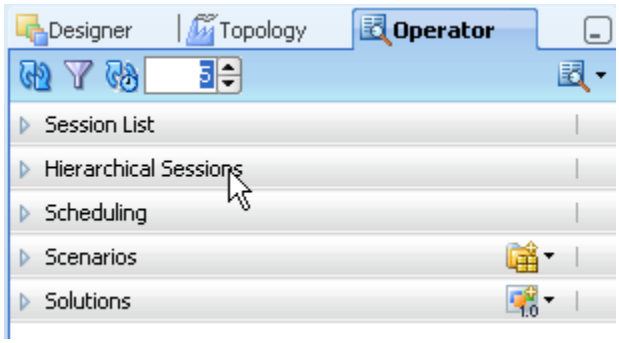


e) Click OK when an Information dialog box appears saying that the session is started.

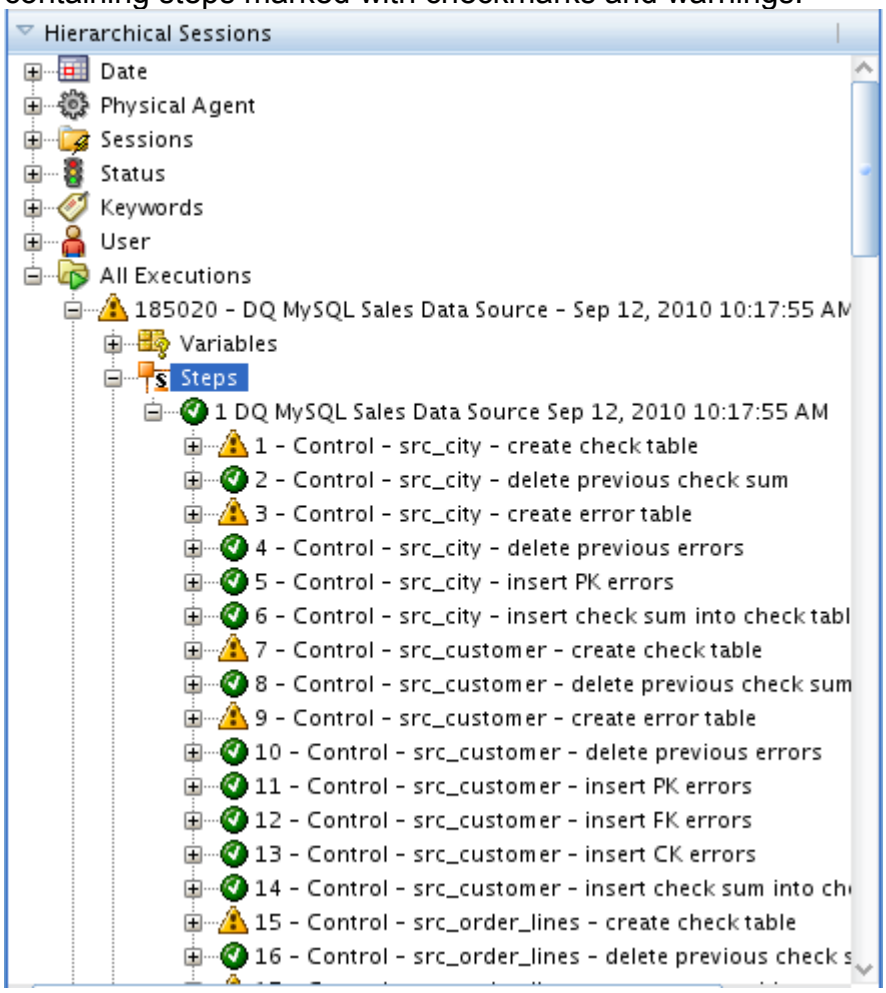


f) Click the Operator Navigator icon tab 

. The Operator window appears. Click Hierarchical Sessions tab.



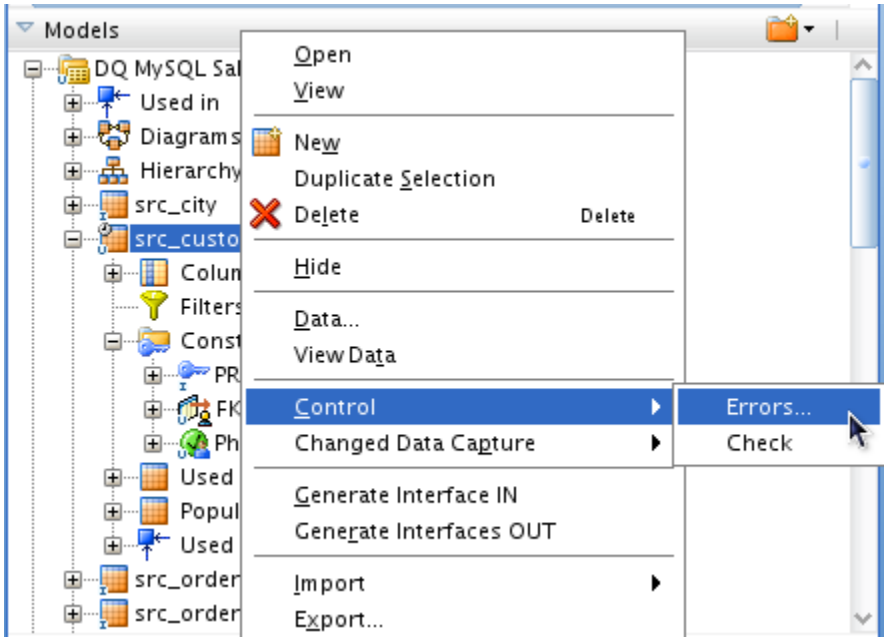
g) Expand the All Executions node. Expand the Sales Data Source session. Expand its Steps node. The session should appear as complete, containing steps marked with checkmarks and warnings.



Note: You can optionally review the content of this session and see the different SQL commands issued to perform the check operations.

5) Review the errors detected in the SRC_CUSTOMER datastore.

a) Click the Designer tab. In the Designer window, expand the DQ MySQL model, select the SRC_CUSTOMER datastore, right-click and select Control > Errors.



b) A table appears listing the errors detected in your table. You have one join error and seven invalid phone numbers. Each line also contains the content of the invalid record.

Data

	ODI_ERR_TYPE	ODI_ERR_MESS	ODI_CHECK_DATE	CUSTID	D
1	S	A phone number should contain more than 8 characters	-09-12 10:17:57.0	129	
2	S	A phone number should contain more than 8 characters	-09-12 10:17:57.0	124	
3	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	141	
4	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	128	
5	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	125	
6	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	118	
7	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	115	
8	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	112	
9	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	111	
10	S	Join error (FK_src_customer_src_city) between the table src_custo	-09-12 10:17:57.0	106	

- How many customers are with an invalid CITY_ID? (8)
- How many customers have a possibly invalid phone number? (2)

c) Close this window.

Lab 15.2: Enforcing Data Quality in the Interface

Prerequisites

Replace SRC_SALES_PERSON.txt file with Lab15_SRC_SALES_PERSON.txt. to SRC_SALES_PERSON_copy.txt. Open terminal window and go to dir /app/Oracle/Middleware/Oracle_ODI/oracledi/demo/file

cp Lab15_SRC_SALES_PERSON.txt SRC_SALES_PERSON.txt

Note: You can copy Clean_SRC_SALES_PERSON.txt if need the original source file.

Process Overview

In the previous practices, you learned how to create ODI Interfaces, which transform data from one or more relational tables in the source to a relational table in the target and to export data from a flat file to a relational table. In this practice, you perform data quality control for the interface created for you for the DQ Lab.

First, for a certain datastore, you verify that the primary key constraint is marked static, and 2 columns are marked mandatory with static control.

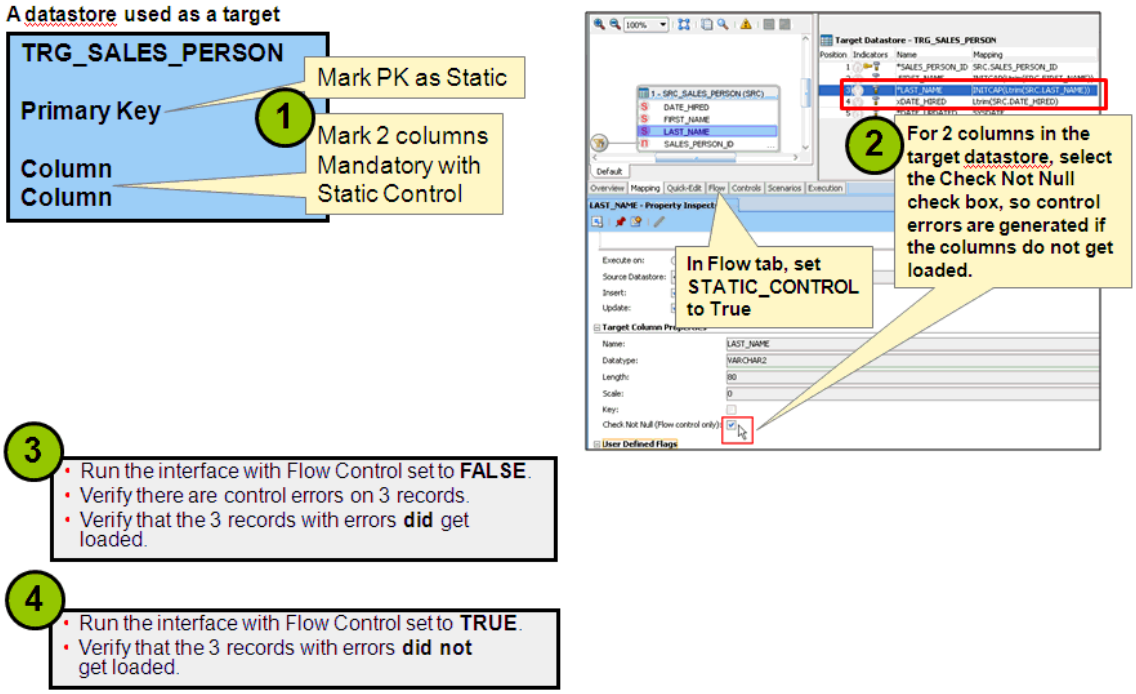
You then create an interface using that datastore as a target.

In the interface's Flow tab, you set STATIC_CONTROL to True. In the Controls tab, you ensure the knowledge module is set to CKM SQL (a knowledge module that you will import) and you set maximum allowed errors to different thresholds to see impact on results.

For 2 columns in the target datastore, you will select the Check Not Null check box, so that control errors will generate if these columns do not get loaded.

You will run the interface with Flow Control set to FALSE. You will verify that there are control errors on 7 records, and that the 7 records with errors **did** get loaded into the target datastore.

Finally, you will re-run the interface, with Flow Control set to TRUE, and verify that errors are **excluded** from the target datastore.



Scenario

You are responsible for data loading, transformation, and validation. You created a project and an interface to export data from a flat file and load this data into a relational table. Now you need to verify the quality of data loaded in the table.

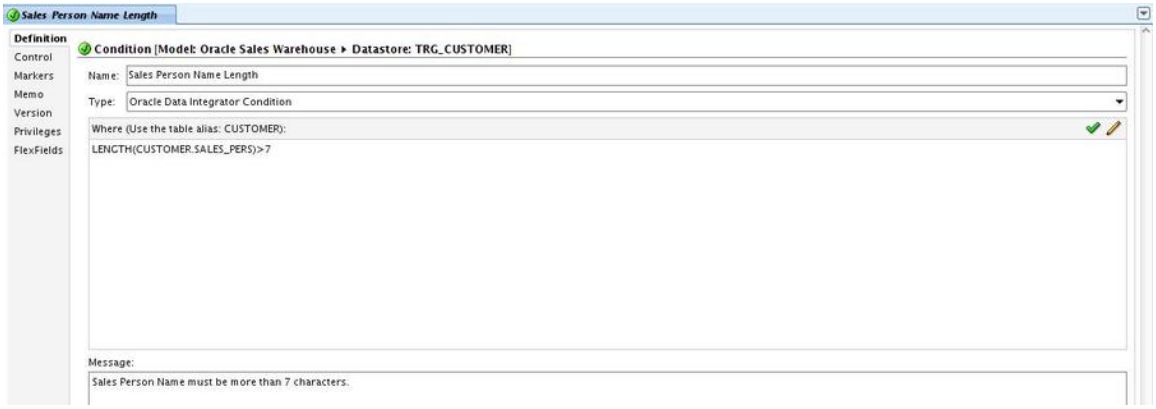
Instructions

If not connected, connect to work repository PTS Training Work Repository.

1) Create a Condition constraint on TRG_CUSTOMER target datastore to check that the sales person name contains eight or more characters.
   a) Open the Oracle Sales Warehouse model and expand the TRG_CUSTOMER datastore. Select the Constraints node, right-click and select the New Condition option.
   b) Enter “Sales Person Name Length” in the Name field.
   c) Select Oracle Data Integrator Condition from the Type drop-down list.
   d) Enter the following expression in the Where field: LENGTH(CUSTOMER.SALES_PERS) > 7. In the Message field, enter “Sales Person Name must be more than 7 characters.”

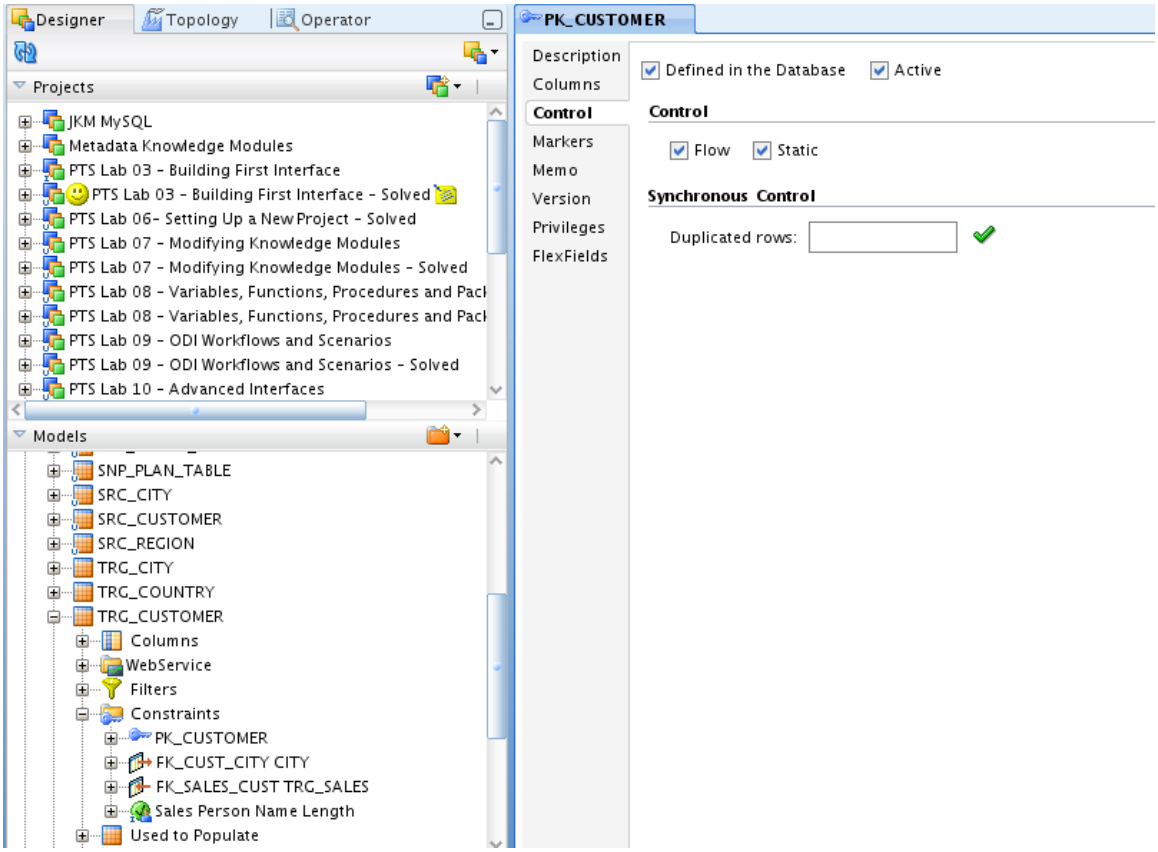
      Note: You can also use the Expression Editor icon to graphically edit this expression.

e) Click the Validation icon to validate your expression syntax.

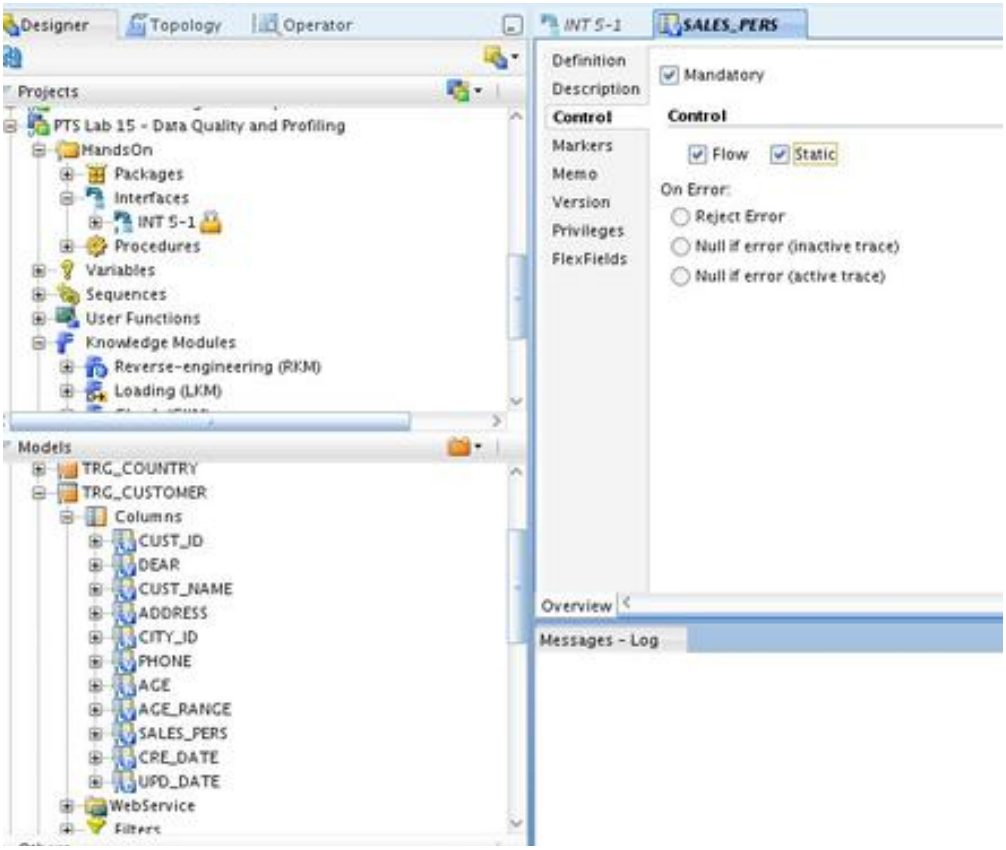


f) Click Save button to add the condition, and the close the tab.

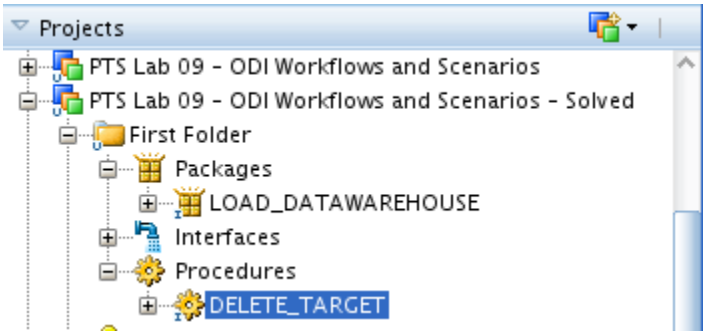
2) In the Models tab, expand Oracle Sales Warehouse > TRG_CUSTOMER> Constraints, and then double-click PK_CUSTOMER. Click the Control tab and verify that Static is selected.



3) In the model Oracle Sales Warehouse, expand TRG_CUSTOMER > Columns, double-click column SALES_PERS, and then click the Control tab. Select Static to enable static control. Select the Mandatory check box. Click Save button.

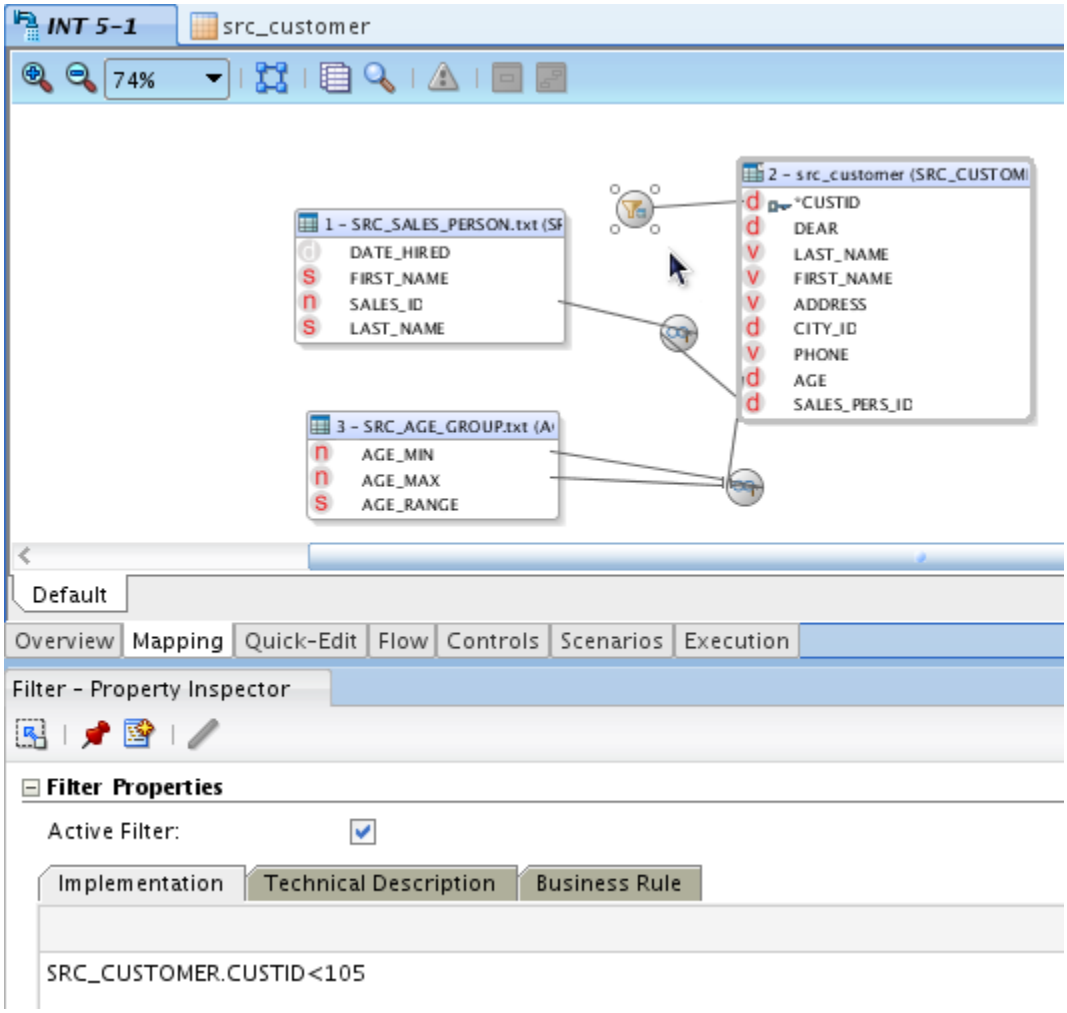


4) In the Projects tab, expand Procedures for PTS Lab 09 - ODI Workflows and Scenarios – Solved. Execute DELETE_TARGET to clear TRG_CUSTOMER table.

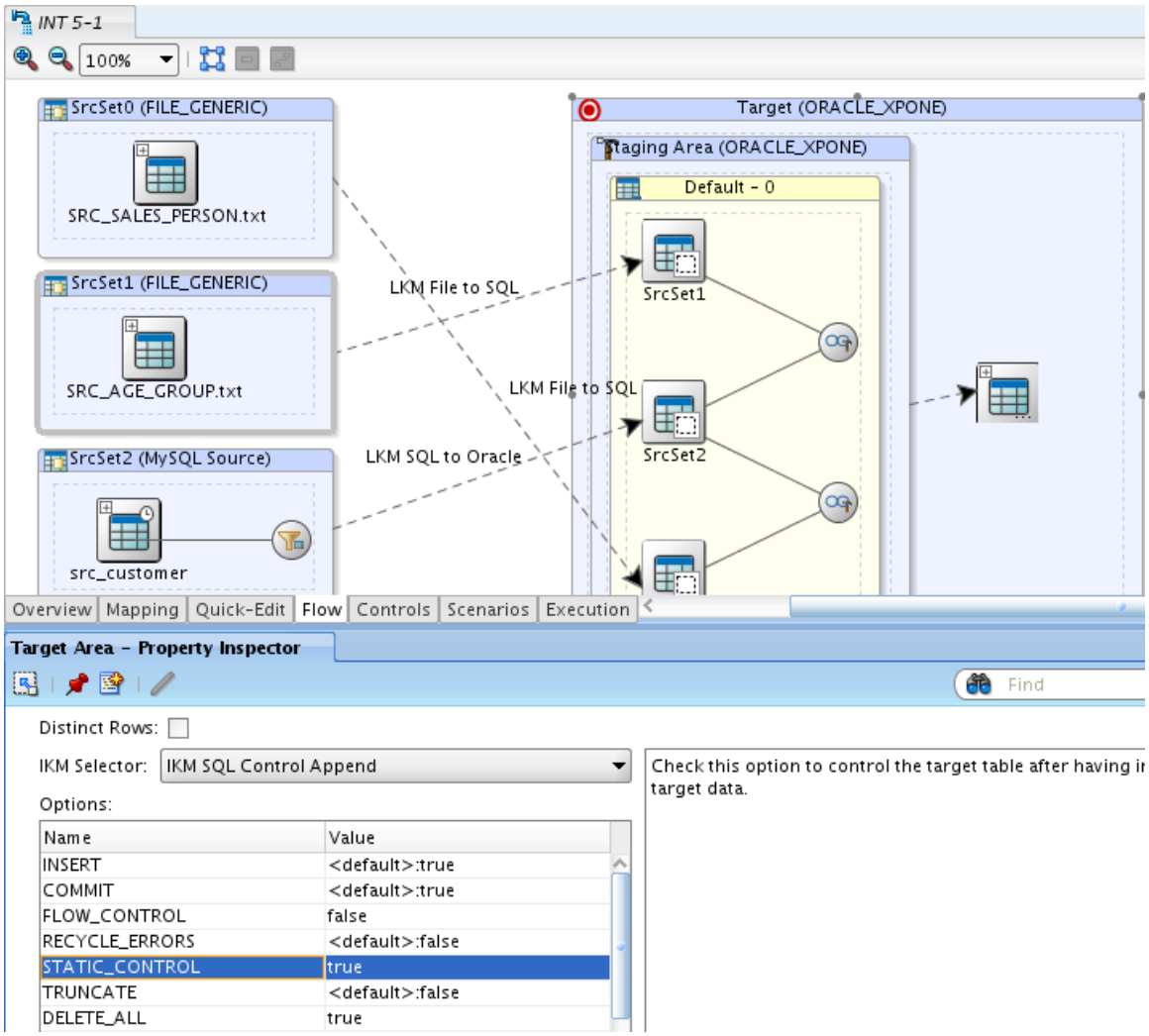


5) In the Projects tab, open interface for the PTS Lab 15.

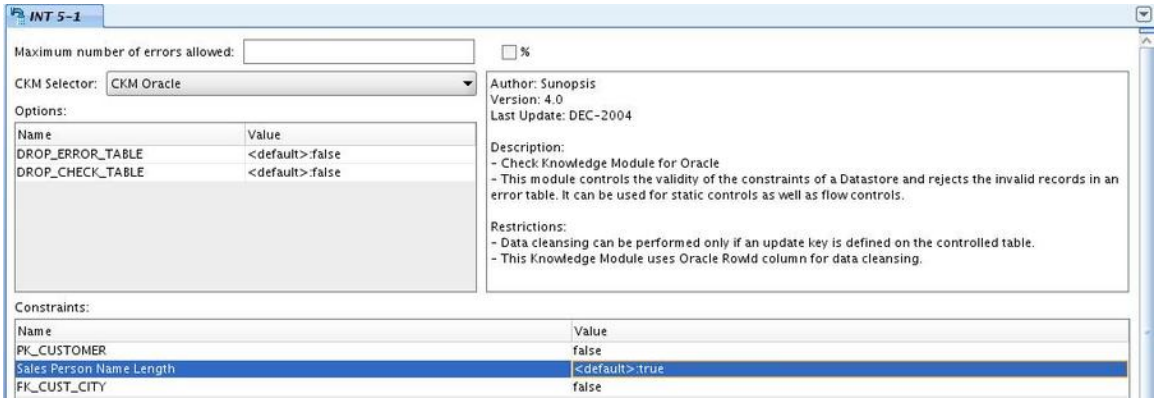
   a) In the Mapping tab, remove the CUST_ID filter.



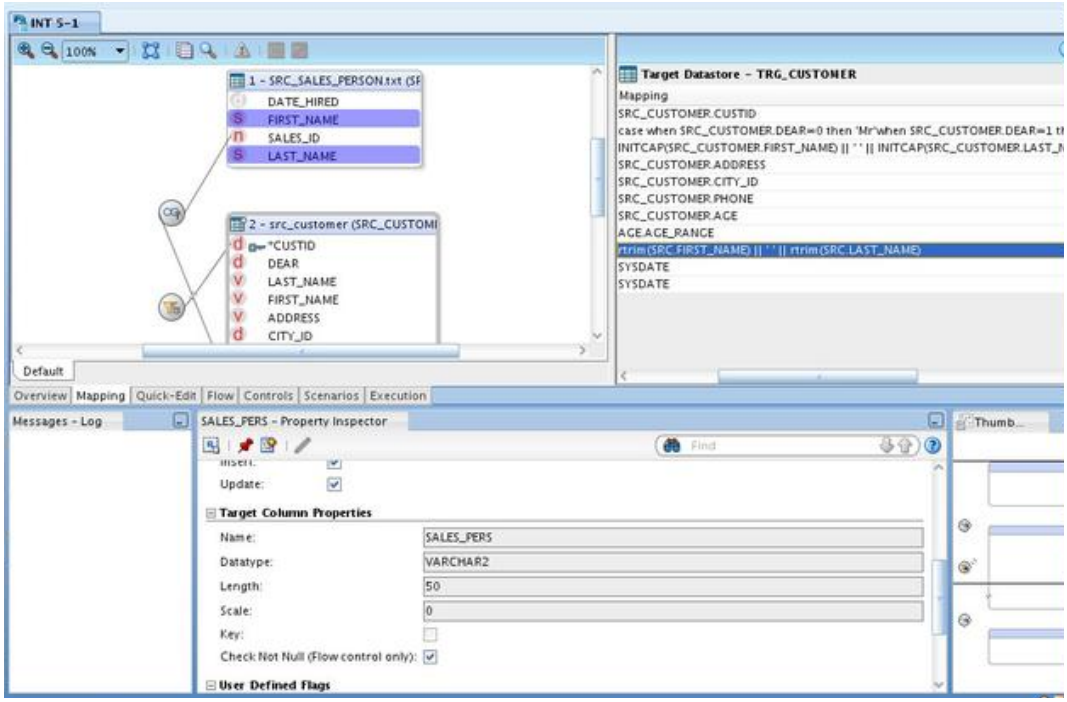
b) Click the Flow tab. In the Flow tab, Click Target + Staging Area (ORACLE_XPONE) to open the options section. Set the static control option to true. Click the Controls tab.



c) On the Controls tab, make sure your KM is set to CKM Oracle. Clear the maximum number of errors allowed. Set PK_CUSTOMER and FK_CUST_CITY to false. Click the Mapping tab.

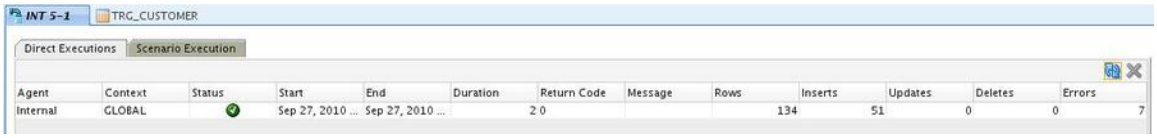


d) In Target Datastore, select the SALES_PERS column, and then select the Check Not Null check box. Click the Execute button to execute the Interface. Click Save button to save your changes.

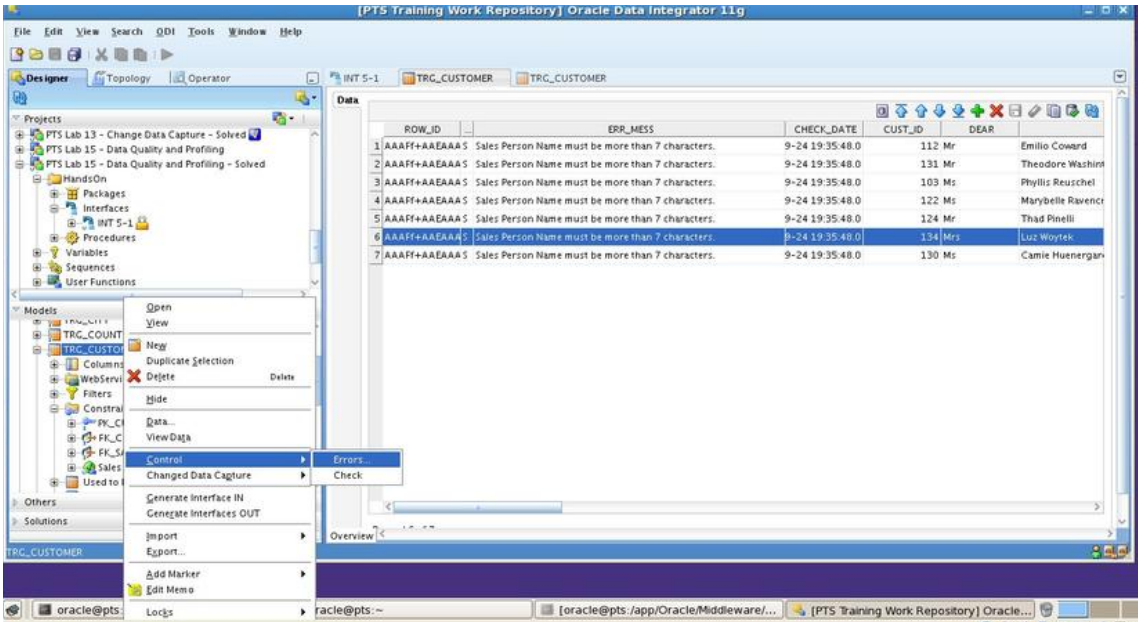


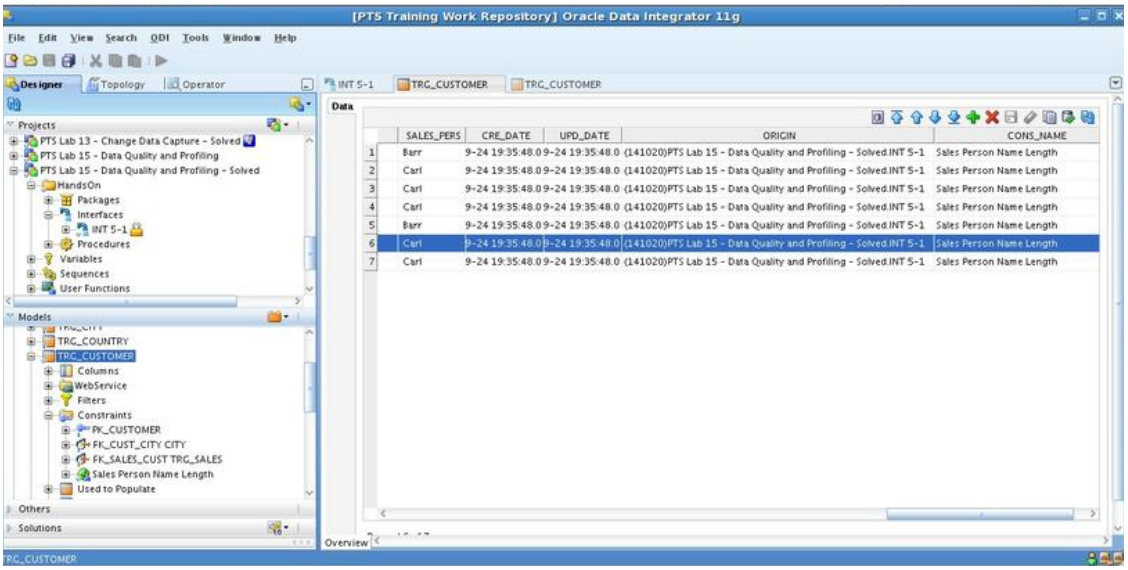
6) Execute your Interface  . Click the Execution tab to view execution results with the number of errors as shown in the screenshot.

Note: You may need to click the Refresh  icon to view your last execution.

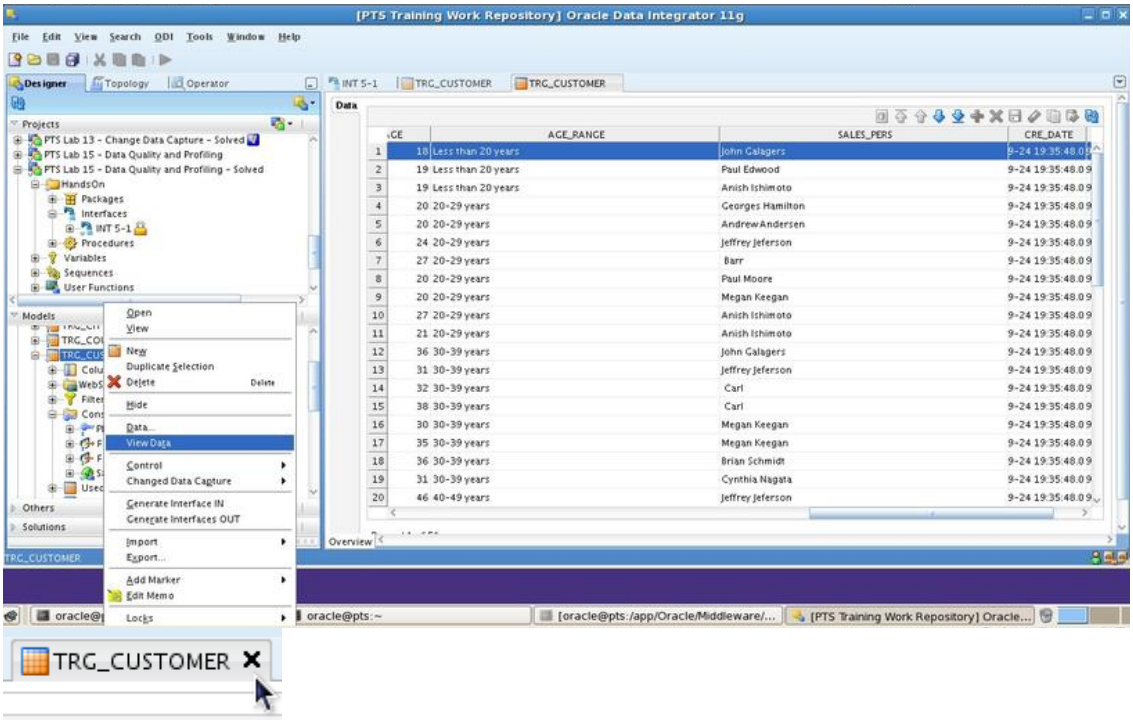


7) On the Models tab, right-click the TRG_CUSTOMER target datastore and select Control > Errors. View the records with errors as shown below:

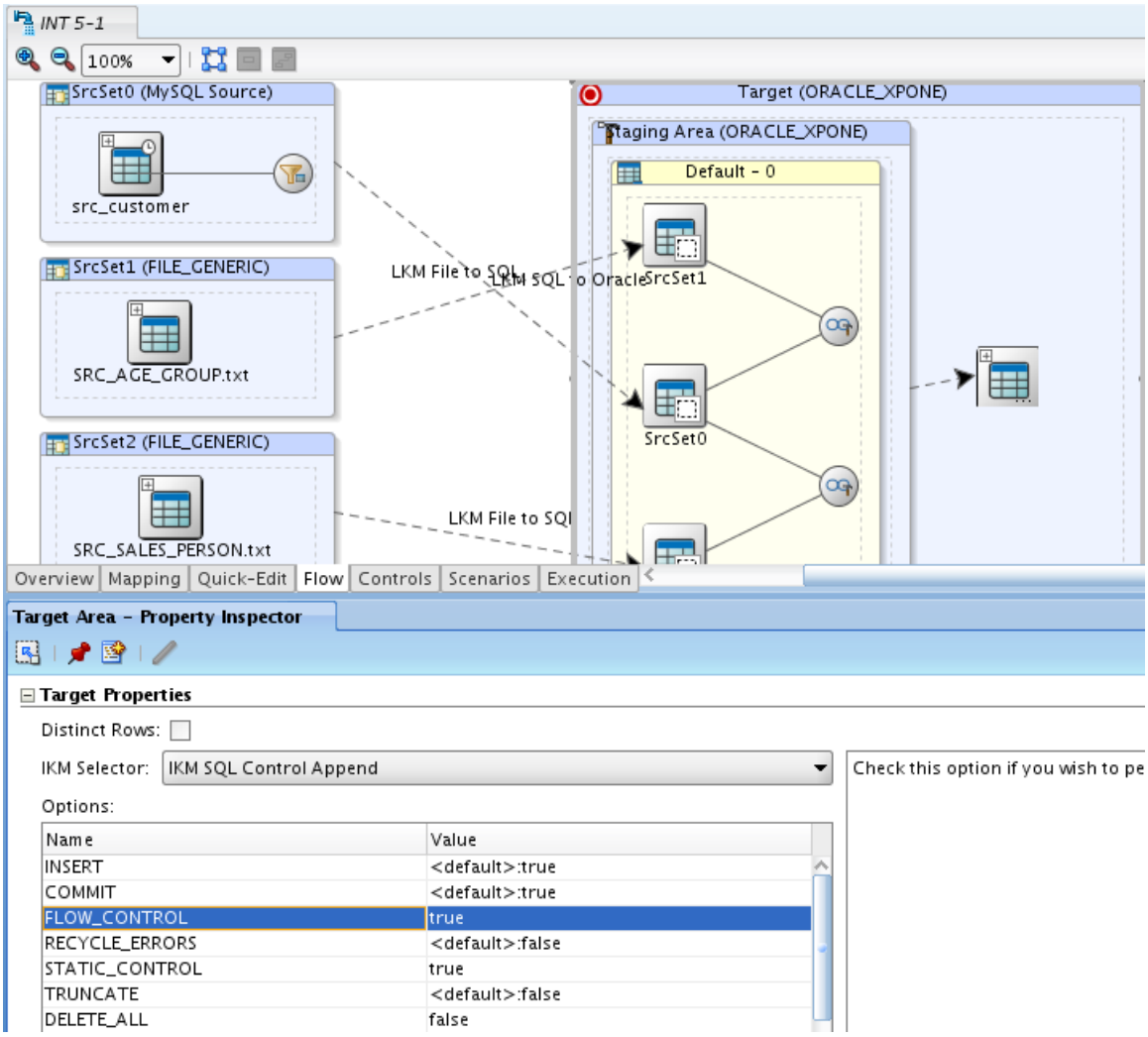




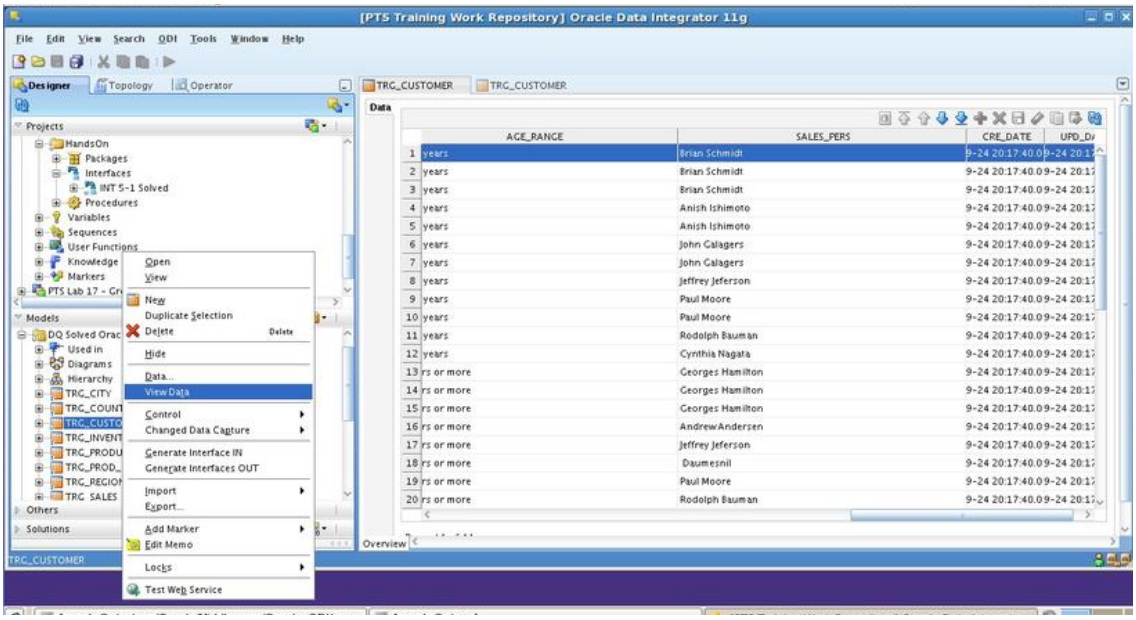
8) Right-click TRG_CUSTOMER datastore and select View Data. Verify that the rows with errors are still inserted in the target datastore. Close TRG_CUSTOMER data tabs.



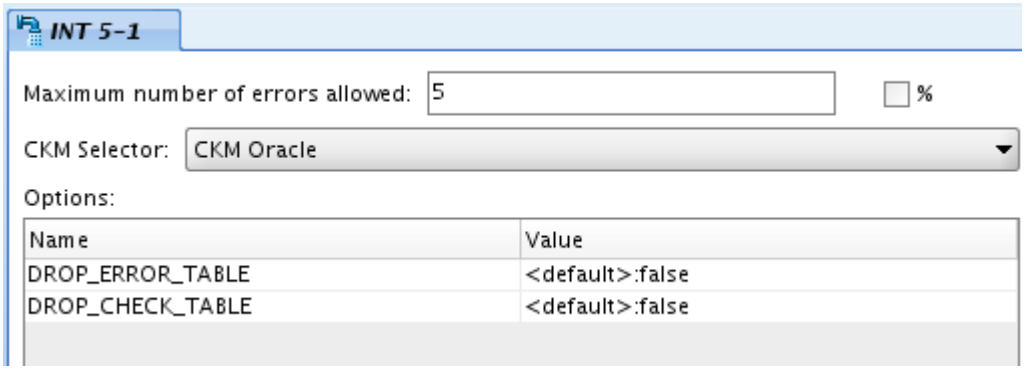
9) Click the INT 5-1 tab. On the Interface screen, click the Flow tab. Set Flow Control to true. Save changes, and then execute the interface .



10) On the Models tab, right-click TRG_CUSTOMER and select View Data. Verify that the rows with errors are excluded from data in the target datastore. Close the tabs.



11) See what happens when you change the threshold for errors allowed. Repeat Step 4 to Execute DELETE_TARGET to clear TRG_CUSTOMER table. Set the Maximum number of errors allowed to 5. Save and execute the interface. How many records are inserted?



Lab 16: ODI and GoldenGate

Introduction

Oracle Data Integrator and Oracle GoldenGate combined enable you to rapidly move transactional data between enterprise systems. By using a Knowledge Module approach, Oracle Data Integrator and Oracle GoldenGate can be connected to provide greater optimization and extensibility. Specifically the ODI Knowledge Module for Oracle GoldenGate leverages the power of Oracle GoldenGate for its real-time log-based CDC. This gives users the following technical benefits:

- Reduces the invasiveness of extracts on the source systems via log-based change data capture
- Minimizes the overhead on source systems
- Automates Oracle GoldenGate deployment directly from using a single UI, eliminates manual entry of config files
- Provides a common best practice pattern loading operational stores or data warehouses in 'mini-batch' to remove batch window dependency
- Enables transformations at the row-level during data capture or delivery, as well as high performance set-based transformations within the target database
- Improves recoverability of data by persisting changed data

Prerequisites

Basic knowledge of Oracle Data Integrator and GoldenGate, Installed Oracle Data Integrator, Oracle GoldenGate and Oracle Database instance.

Process Overview

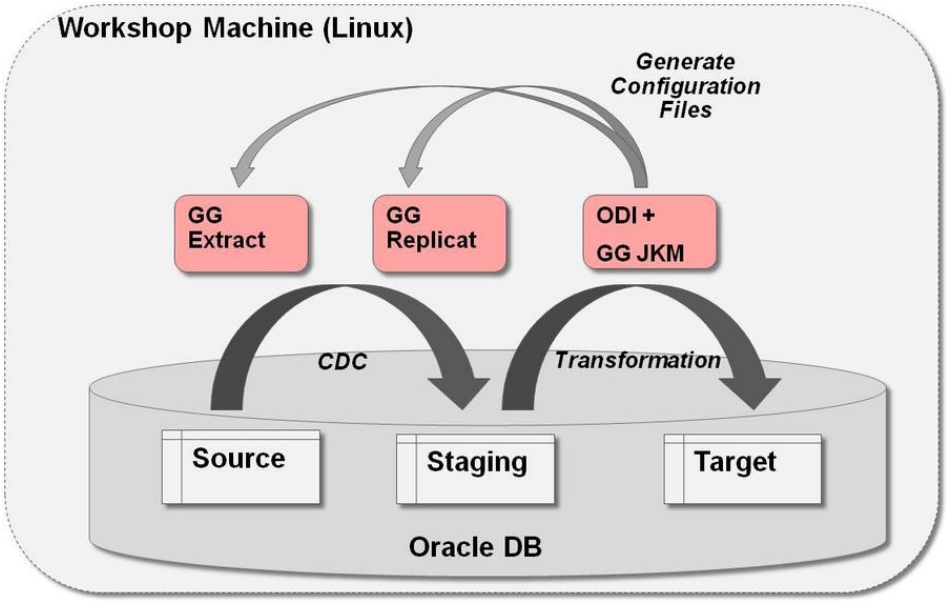
Data integration is more than simply about ETL (extract, transform, load); it's also about unifying information for improved business agility. This hands-on lab—for developers, DBAs, and architects—highlights best practices using Oracle Data Integrator (ODI) and Oracle GoldenGate (OGG) together to perform real-time ETL. In the lab, participants will use ODI's Journalizing Knowledge Module for OGG to generate OGG scripts based on ODI models and interfaces.

Scenario

In this lab we are going to add OGG CDC to an existing ODI project. The project is mostly identical to the ODI Hands-on Lab that covers ODI CDC mechanisms.

For simplicity the entire setup is on one machine using a single database. Real-live use cases would most likely use source and target on different servers, but the fundamental setup of OGG and ODI are very similar.

The demo machine has two separate installations of OGG, one in /app/GoldenGate as a source set up and one in /apps/GoldenGate_stg as a staging area set up. These two locations simulate OGG installations on two separate machines.



Part 0: Preparation Steps

In these steps you will clean and setup the environment for this exercise

1) Open terminal and go to directory /home/oracle/Desktop/Reset_Workshop
Run following two sh file from command line:

> ./reset_for_goldengate.sh

> ./reset_for_gg2.sh

2) Delete dir ODIS_to_ODIT1 from /tmp folder, if exists:

/tmp> **rm -r ODIS_to_ODIT1**

3) Delete any contents in **dirdat** and **dirdef** folders from source and staging on GG installation, /app/GoldenGate and/app/GoldenGate_stg directories

Part 1: Enable Staging Model for CDC

In this exercise you will review the existing models and projects in ODI

1) Start GoldenGate manager for source as well as for staging area

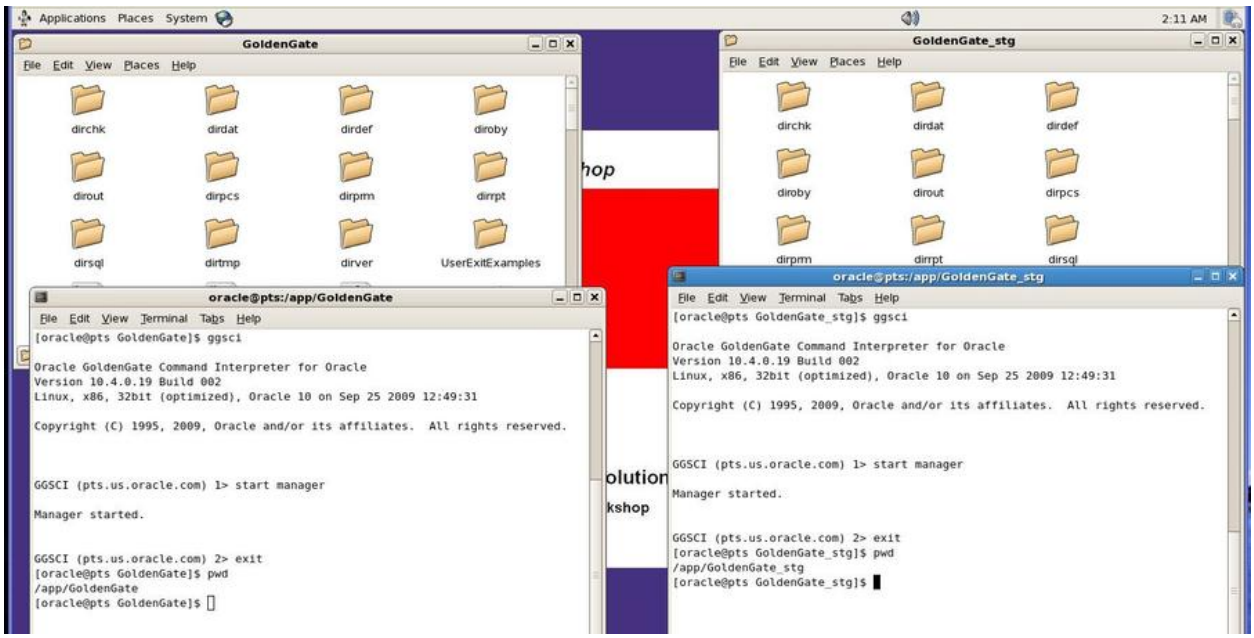
Open terminal window and go to directory /app/GoldenGate and run command as:

> ggsci

GGSCI (pts.us.oracle.com) 1> start manager

GGSCI (pts.us.oracle.com) 2> exit

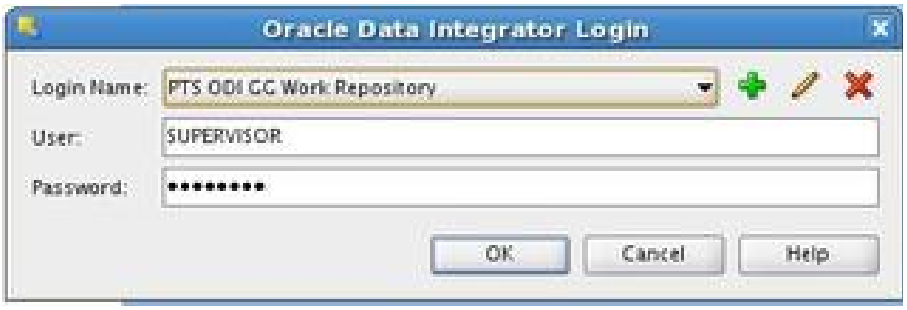
Repeat the same for /app/GoldenGate_stg directory, which is our staging area. Running manager program starts GoldenGate manager process which is parent process to start/manage other processes like extract, replication, etc. Following image shows manager process started for source and stage servers.



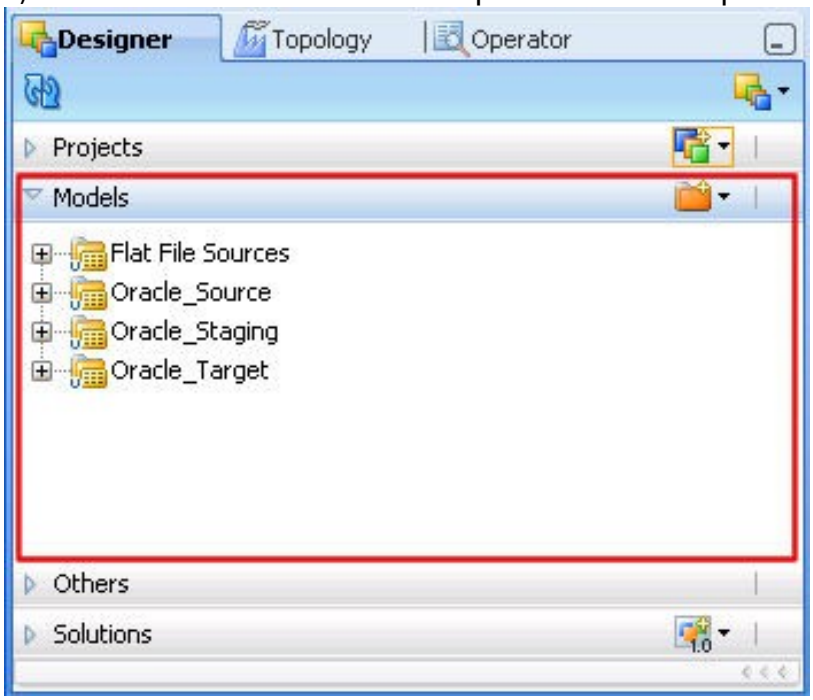
2) Open the Oracle Data Integrator Studio using the command ***odistudio*** within any terminal window.

Choose the **Designer** tab and click on **Connect To Repository…**

In the Login dialog, choose **PTS ODI GG Work Repository** from the **Login Name** list.

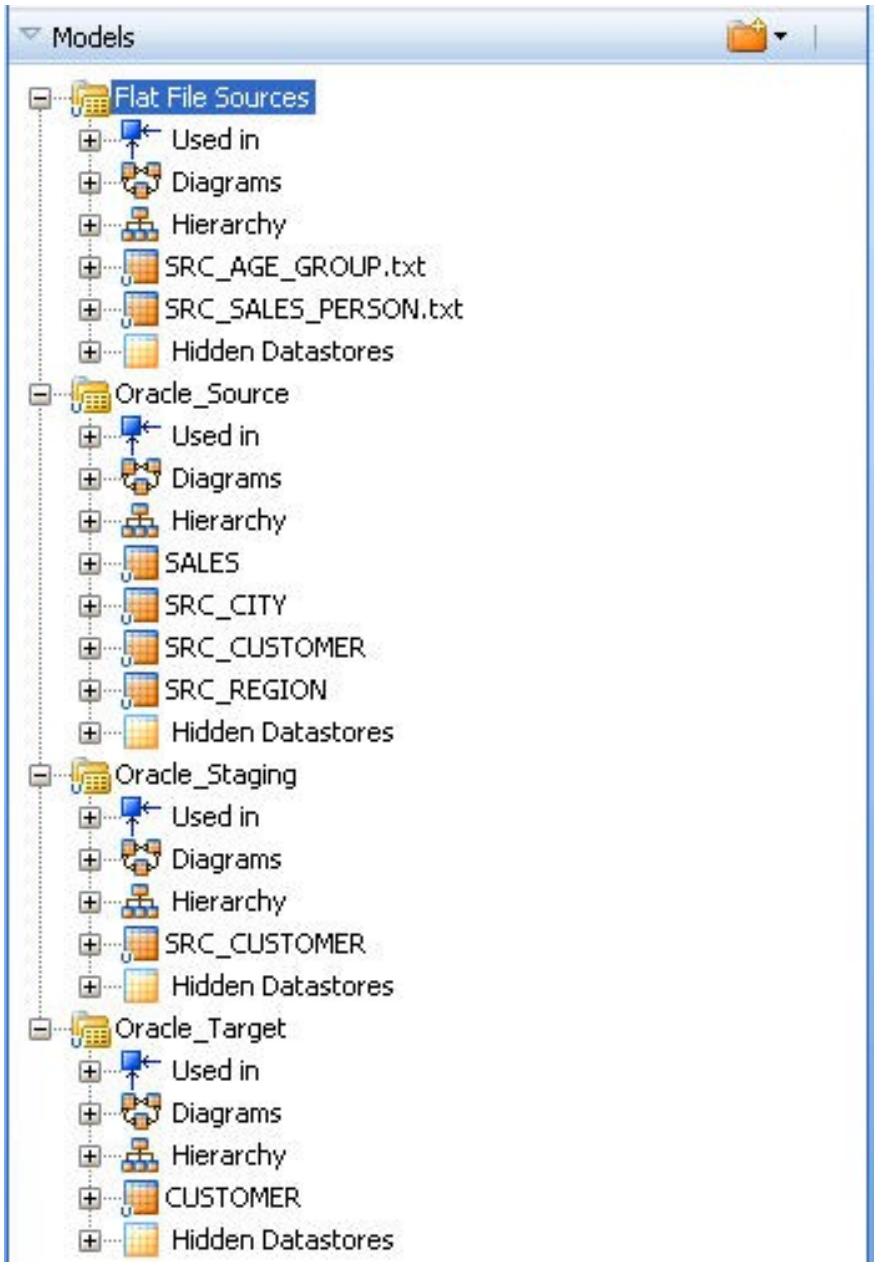


3) Click on the **Models** title to expand the models pane.



4) **Review the models present in the repository**:

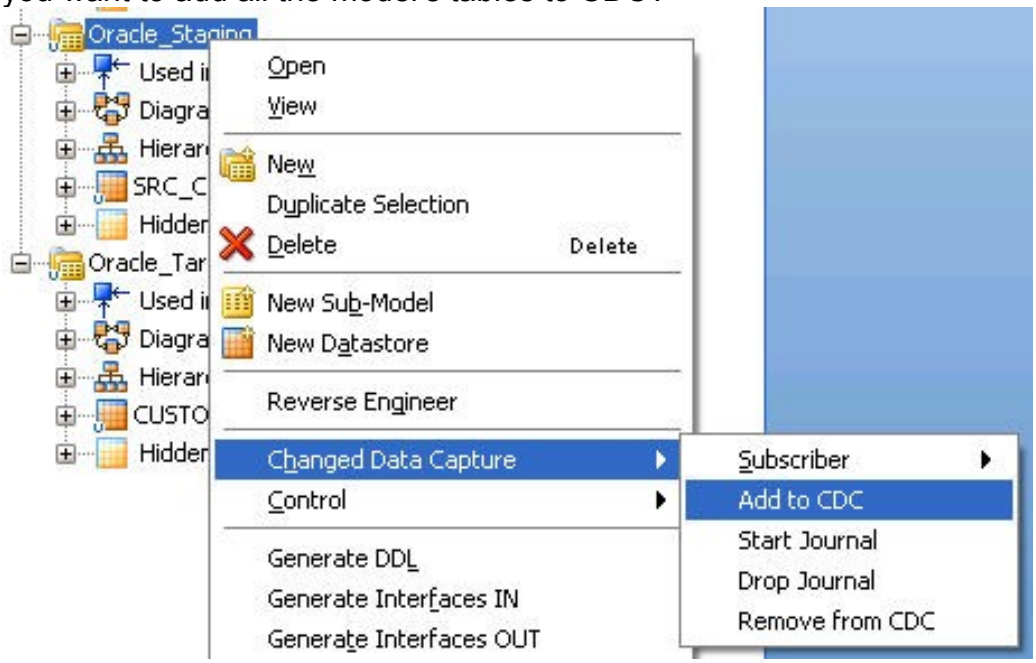
Expand each one of the 4 models Oracle_Source, Oracle_Staging, Oracle_Target, and Flat File Sources. The **Oracle_Source** model contains the tables in the original source location. **Oracle_Staging** contains copies of tables from the source that need to be replicated by Oracle GoldenGate in real-time. The **Oracle_Target** model contains transformed tables in the final target location. The **Flat File Sources** model contains flat file datastores that will participate in the transformation to the target table.



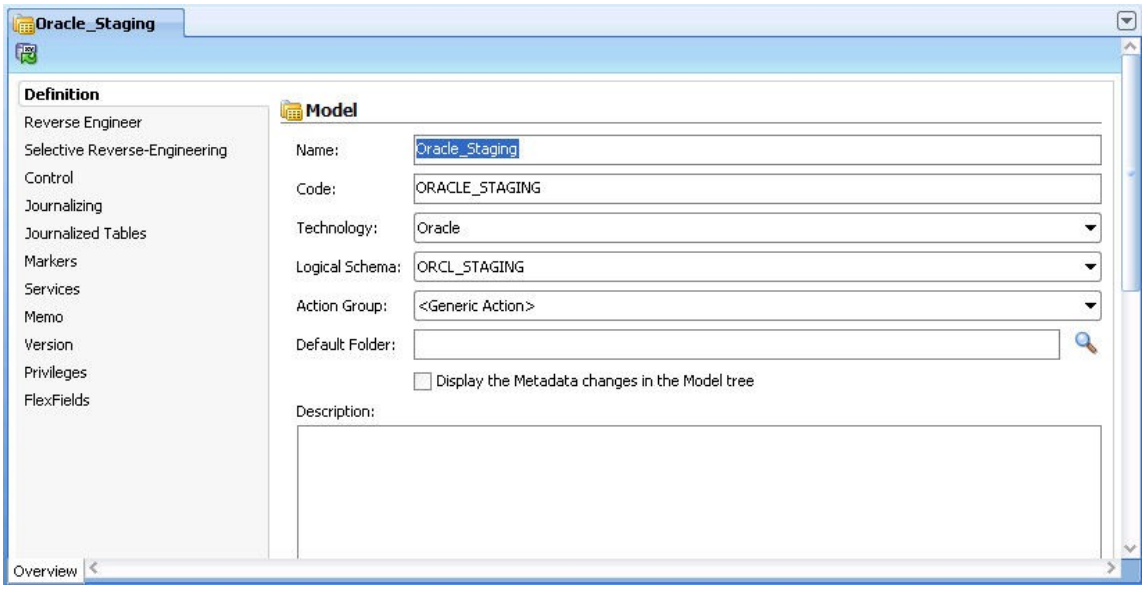
5) **Enable the staging model for ODI CDC**: The JKM for Oracle GoldenGate performs a 2-stage CDC; OGG detects changes in the source and replicates

them to the staging tables; ODI is informed of changes arriving in the staging table through its standard CDC framework; therefore the staging tables are enabled for CDC and generate OGG scripts to perform replication from source to staging.

Right-click on the model **Oracle_Staging**, go into the submenu **Changed Data Capture**, and select **Add to CDC**. Press **Yes** when asked "Are you sure you want to add all the model's tables to CDC?"

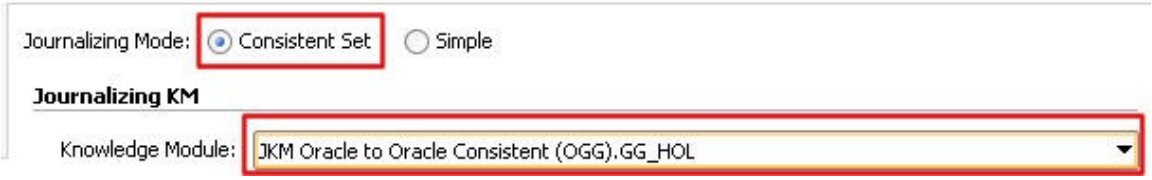


6) Double-click on the model **Oracle_Staging** to open the model editor



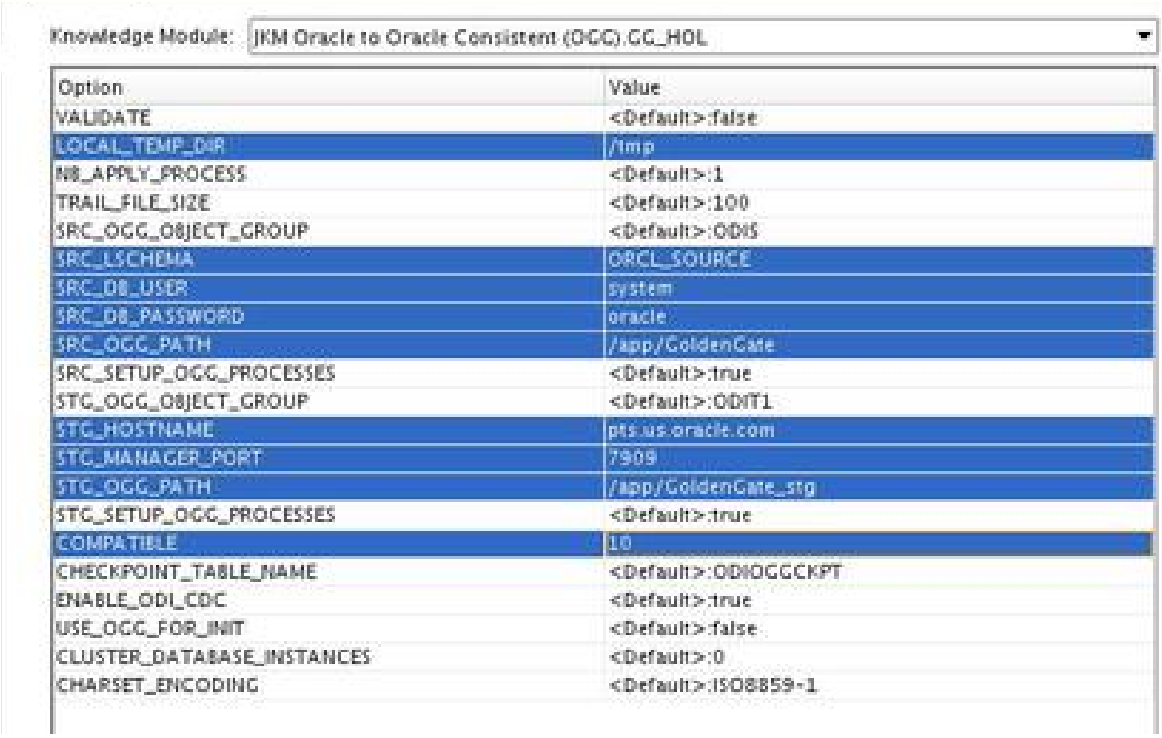
7) Go to the **Journalizing** tab.

8) In Journalizing Mode pick **Consistent Set**, press Ok in the Alert dialog, and in Journalizing KM pick "**JKM Oracle to Oracle Consistent (OGG)**".



9) Enter the following options (highlighted in red) to the JKM. Leave options starting with <Default> unchanged.

NOTE PASSWORD for SRC_DB_PASSWORD is oracle

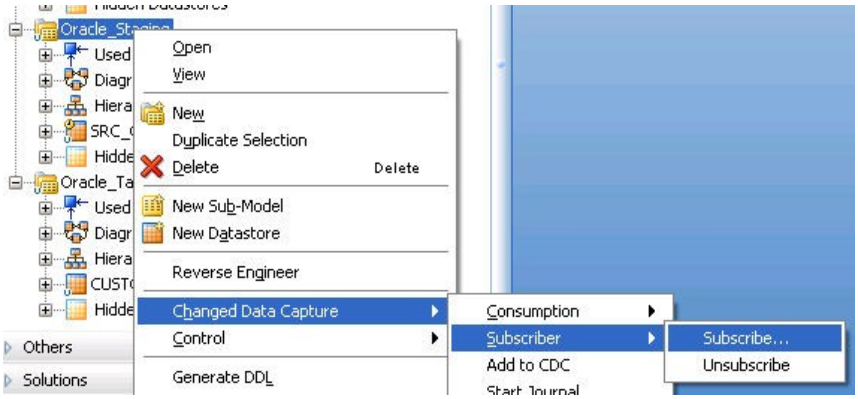


Values:

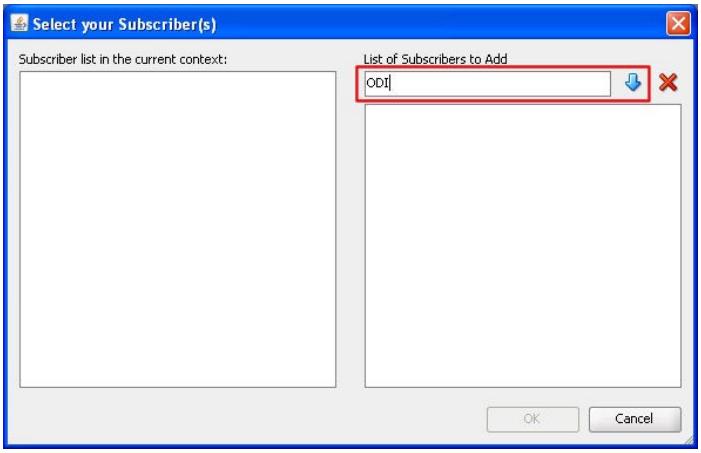
LOCAL_TEMP_DIR	/tmp
SRC_LSCHEMA	ORCL_SOURCE
SRC_DB_USER	system
SRC_DB_PASSWORD	**oracle**
SRC_OGG_PATH	/app/GoldenGate
STG_HOSTNAME	pts.us.oracle.com
STG_MANAGER_PORT	7909
STG_OGG_PATH	/app/GoldenGate_stg
COMPATIBLE	10

Press Save( ) to save the model; close the model editor.

10) Right-click on model **Oracle_Staging**, go into the submenu **Changed Data Capture > Subscriber**, and select **Subscribe…**.

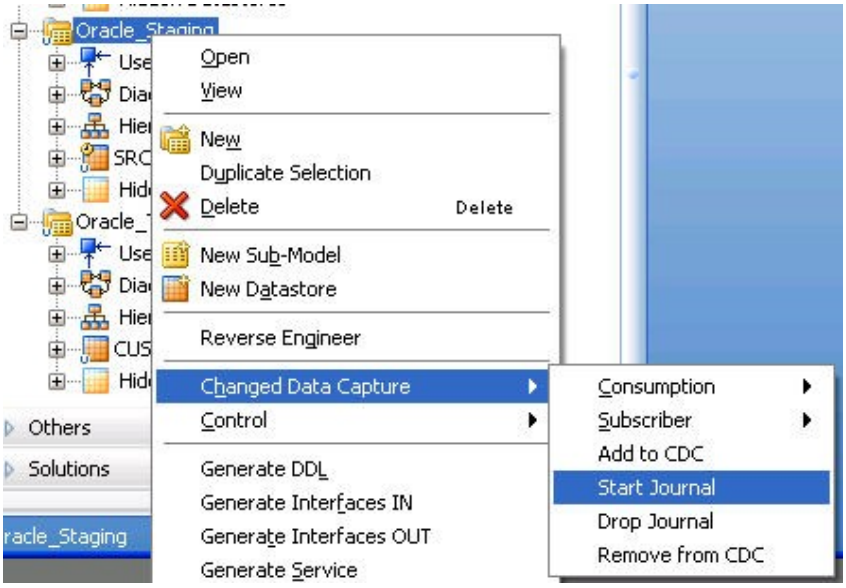


Enter **ODI** as the name of a new subscriber and press the red Arrow Down button to add to the list.

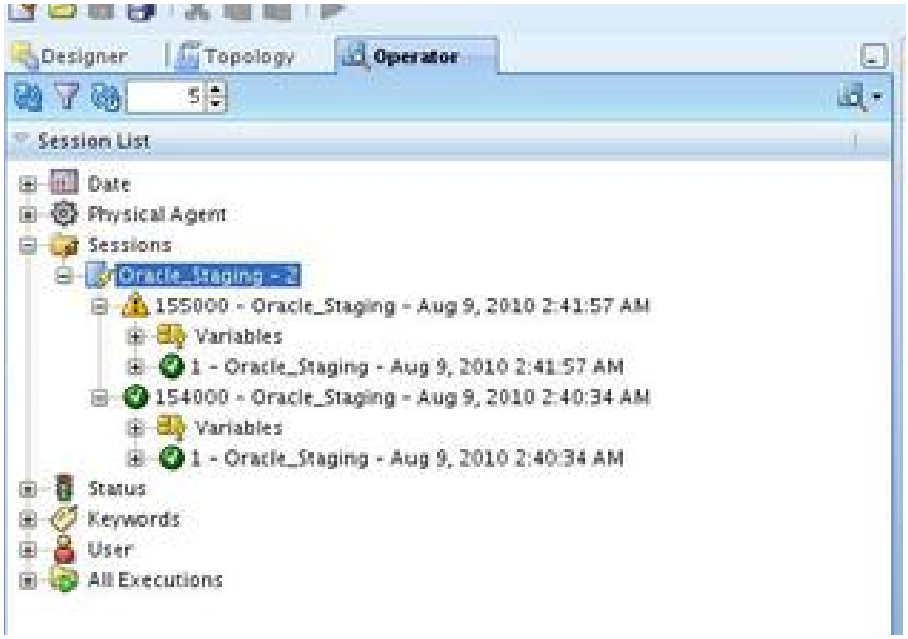


11) Press OK to close the dialog. Press **Ok** on the **Execution** and then **Information** dialogs that appear.

12) Right-click on **Oracle_Staging**, go into the submenu **Changed Data Capture**, and select **Start Journal**. Press **Ok** on the **Execution** and then **Information** dialogs that appear.

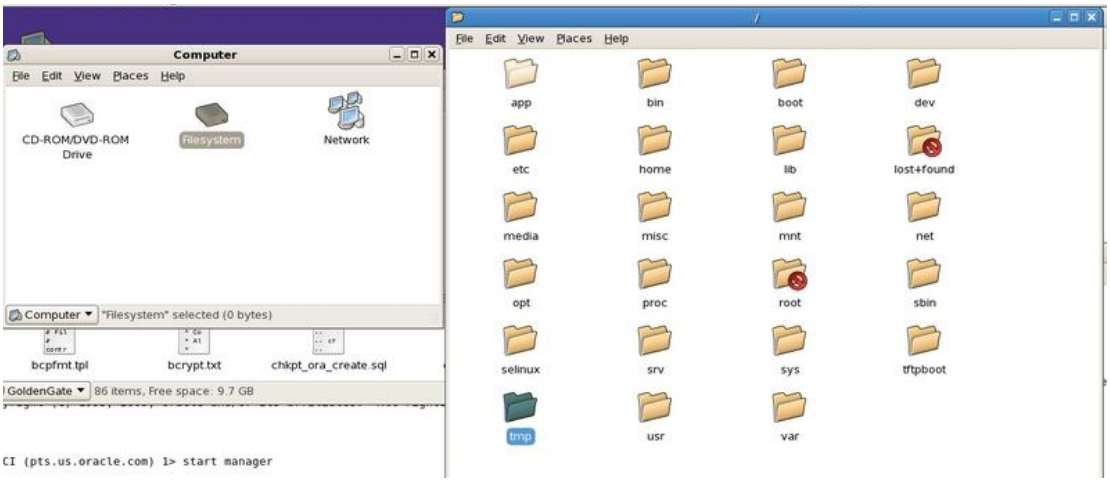


Verify on the Operator tab that both the session have successfully completed.

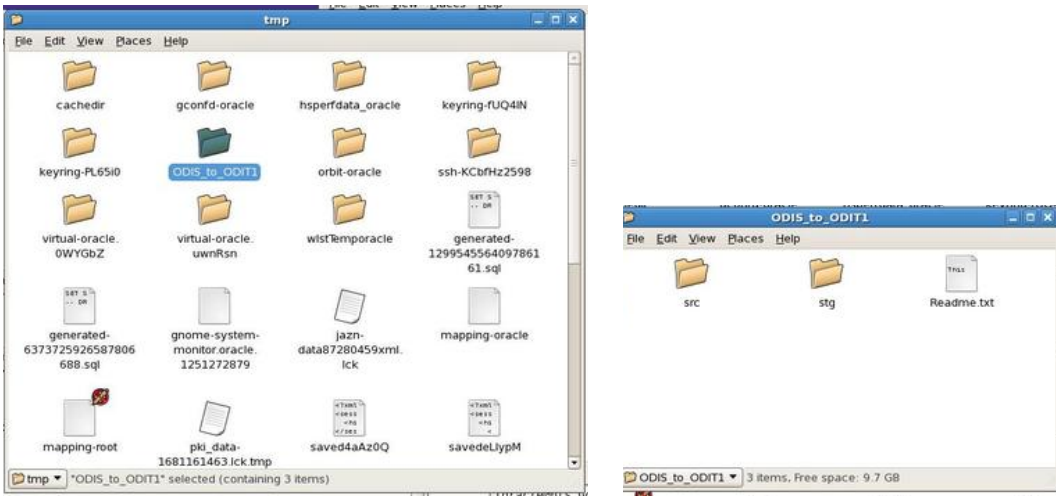


Part 2: Configure Oracle GoldenGate using generated files

1) Open a File Explorer window by opening **Computer** icon on the desktop and change directories to **/tmp**. A new directory called **ODIS_to_ODIT1** should be visible. This directory contains the OGG configuration files that were generated during the **Start Journal** step earlier.



Double-click on ODIS_to_ODIT1 to see src and stg directories

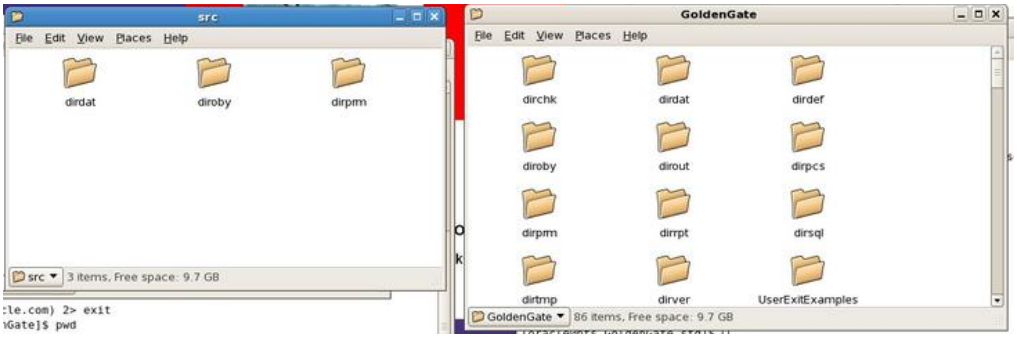


2) Change into the **ODIS_to_ODIT1** directory. You can see two directories containing the configuration files for the source and staging OGG installations, as well as a Readme.txt file explaining the configuration of OGG using these files.

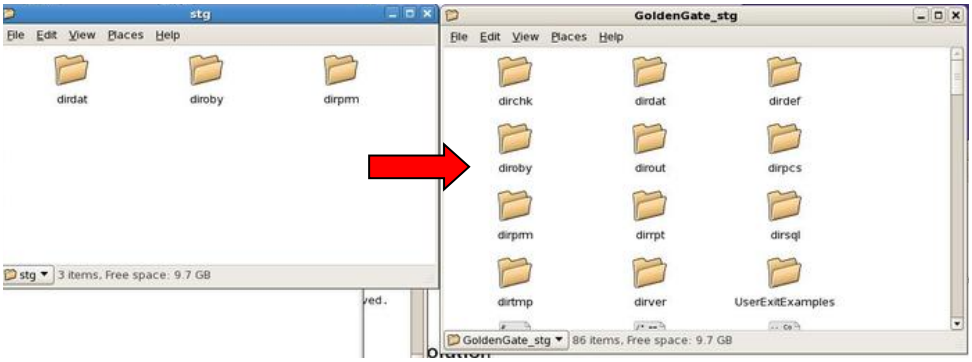
3) Readme.txt file can be reviewed for the configuration steps needed as part of the GG set up. We will perform the 6 actions listed in the Readme in the coming steps.

4) **UPLOAD FILES TO SOURCE MACHINE**: Change directories into **/tmp/ODIS_to_ODIT1/src.** It contains 3 subdirectories dirdat, diroby, and

dirprm which mirror the common OGG directory structure. Open a second file explorer to the directory /app/GoldenGate and copy those 3 subdirectories into it.



5) **UPLOAD FILES TO STAGING MACHINE**: Change directories into **/tmp/ODIS_to_ODIT1/stg**. It contains 3 subdirectories dirdat, diroby, and dirprm which mirror the common OGG directory structure. Open a second file explorer to the directory /app/GoldenGate_stg and copy those 3 subdirectories into it.



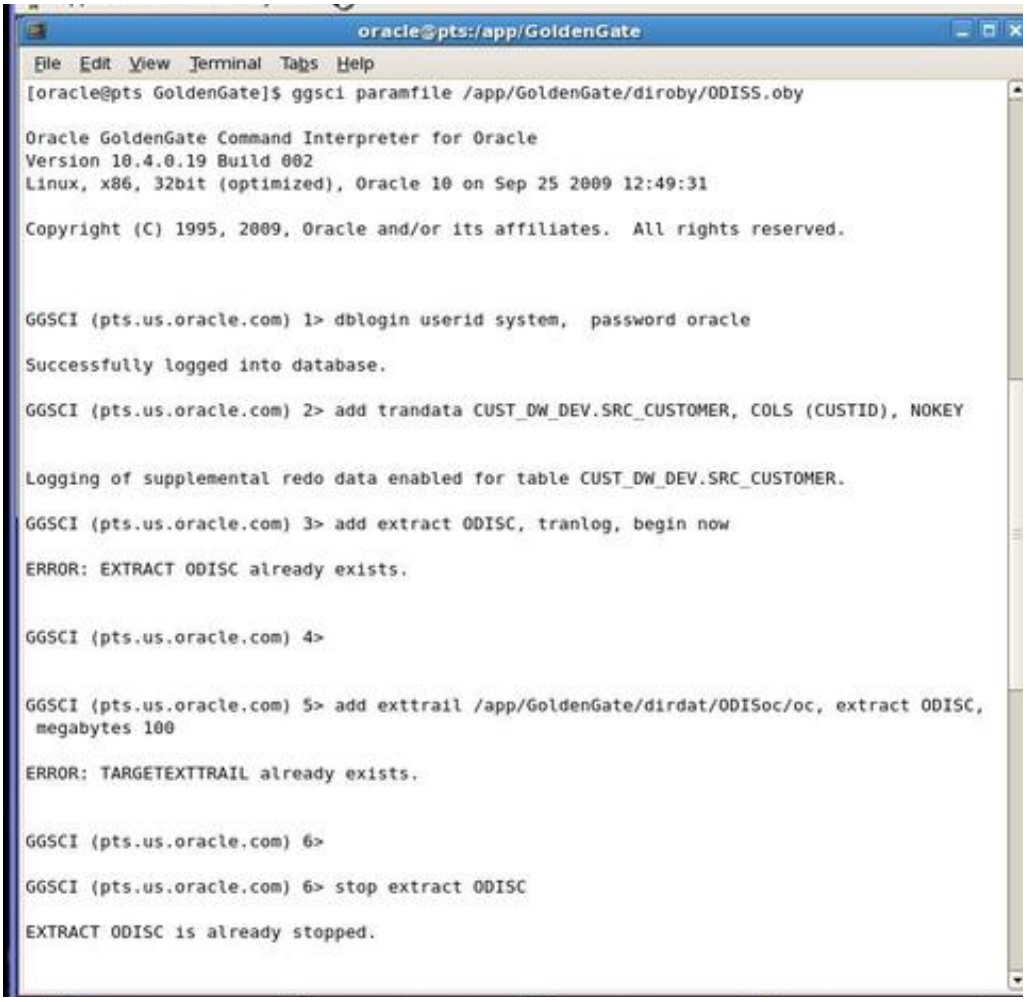
6) **RUN THE SOURCE OBEY FILE**

Enter the following command (Same as in the Readme.txt file):

From /app/GoldenGate directory

> app/GoldenGate/ggsci paramfile /app/GoldenGate/diroby/ODISS.oby

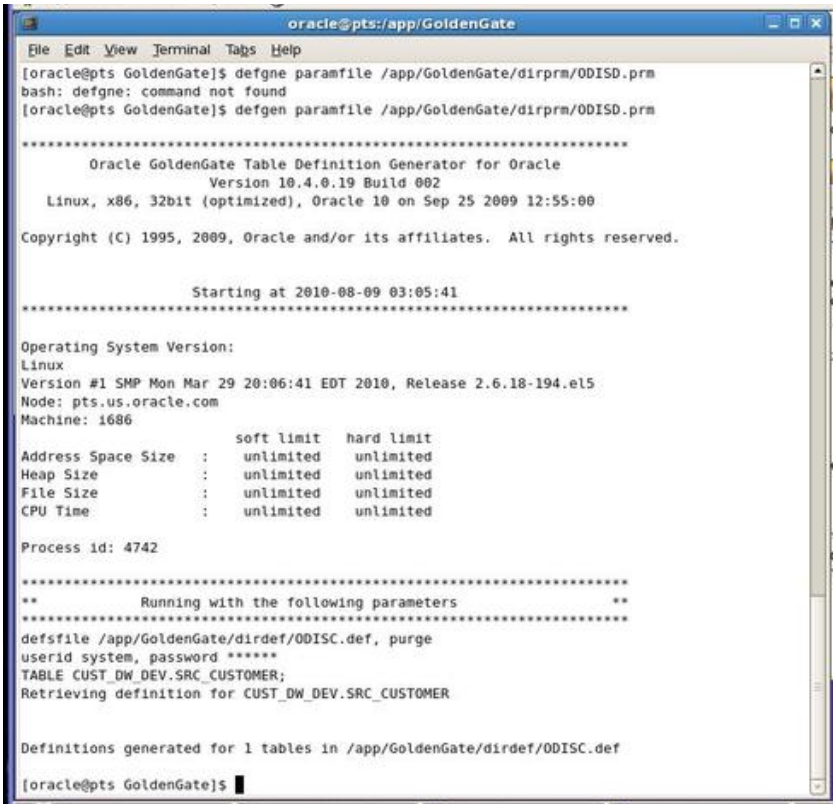
The following output should be shown:


oracle@pts:/app/GoldenGate
File Edit View Terminal Tabs Help
[oracle@pts GoldenGate]$ ggsci paramfile /app/GoldenGate/diroby/ODISS.oby
Oracle GoldenGate Command Interpreter for Oracle
Version 10.4.0.19 Build 002
Linux, x86, 32bit (optimized), Oracle 10 on Sep 25 2009 12:49:31
Copyright (C) 1995, 2009, Oracle and/or its affiliates. All rights reserved.
GGSCI (pts.us.oracle.com) 1> dblogin userid system, password oracle
Successfully logged into database.
GGSCI (pts.us.oracle.com) 2> add trandata CUST_DW_DEV.SRC_CUSTOMER, COLS (CUSTID), NOKEY
Logging of supplemental redo data enabled for table CUST_DW_DEV.SRC_CUSTOMER.
GGSCI (pts.us.oracle.com) 3> add extract ODISC, tranlog, begin now
ERROR: EXTRACT ODISC already exists.
GGSCI (pts.us.oracle.com) 4>
GGSCI (pts.us.oracle.com) 5> add exttrail /app/GoldenGate/dirdat/ODISoc/oc, extract ODISC,
megabytes 100
ERROR: TARGETEXTTRAIL already exists.
GGSCI (pts.us.oracle.com) 6>
GGSCI (pts.us.oracle.com) 6> stop extract ODISC
EXTRACT ODISC is already stopped.


GGSCI (pts.us.oracle.com) 8> add extract ODIT1P, exttrailsource /app/GoldenGate/dirdat/ODI
Soc/oc
ERROR: EXTRACT ODIT1P already exists.
GGSCI (pts.us.oracle.com) 9> add rmttrail /app/GoldenGate_stg/dirdat/ODIT1op/op, extract O
DIT1P, megabytes 100
ERROR: TARGETEXTTRAIL already exists.
GGSCI (pts.us.oracle.com) 10> stop extract ODIT1P
EXTRACT ODIT1P is already stopped.
GGSCI (pts.us.oracle.com) 11> start extract ODIT1P
Sending START request to MANAGER ...
EXTRACT ODIT1P starting
[oracle@pts GoldenGate]$

7) **GENERATE THE DEFINITION FILE:** Enter the following command in /app/GoldenGate directory from terminal window

> app/GoldenGate/defgen paramfile /app/GoldenGate/dirprm/ODISD.prm

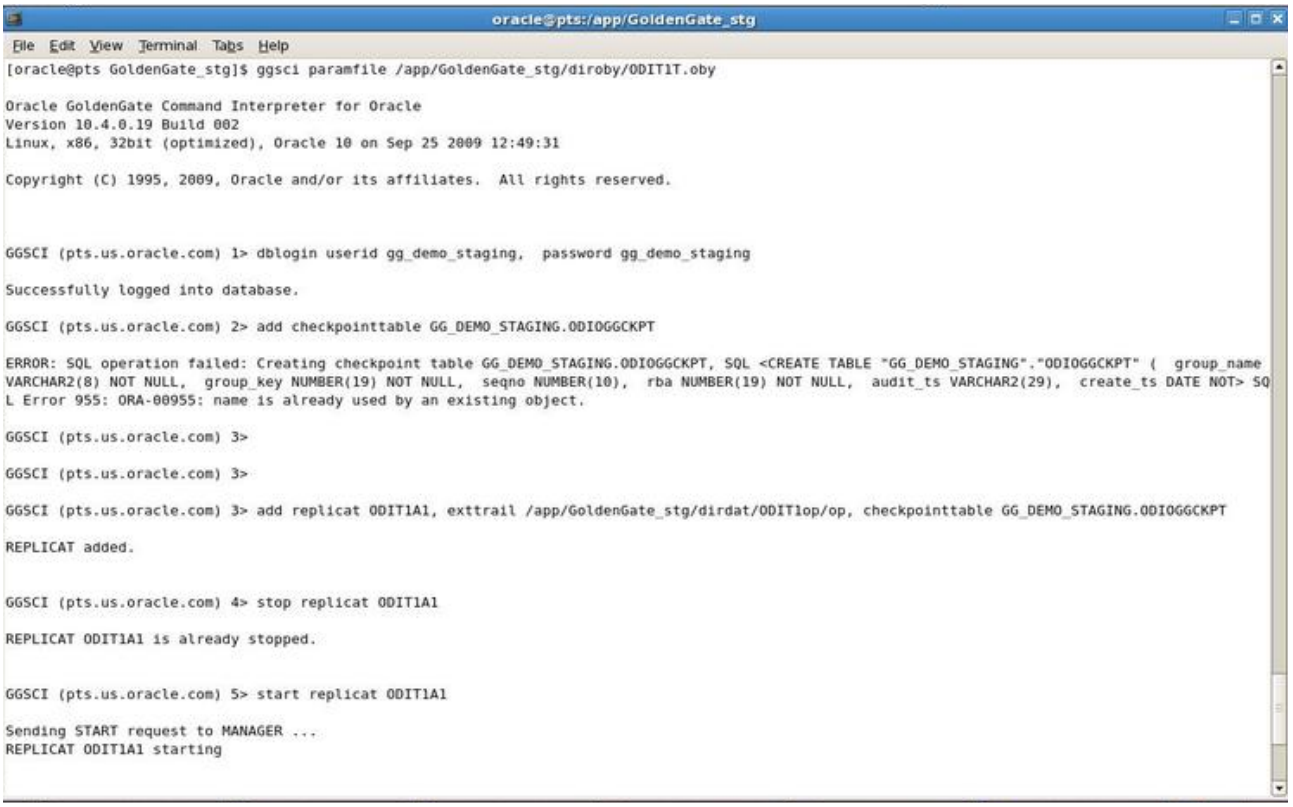


8) **COPY DEFINITION FILE**:
Run following command to copy definition file from source to staging area:

cp /app/GoldenGate/dirdef/ODISC.def /app/GoldenGate_stg/dirdef/

9) **RUN THE STAGING OBEY FILE:** Enter the following command in a terminal window from /app/GoldenGate_stg directory

> ggsci paramfile /app/GoldenGate_stg/diroby/ODIT1T.oby



If you see error on message for add checkpoint table in log above, you can ignore it since the error can occur if table already exists.

Important:

After you finished above steps, from /app/GoldenGate dir, open ggsci shell by typing ggsci at command line. > ***ggsci*** . Once in ggsci shell, you can check status of gg processes by typing command ***info all*** , which should show three processes running on source side; one manager and two extract processes. You can check the same for staging server from /app/GoldenGate_stg dir, which should show two processes running; one manager and one replication process. If any of the process is not running or shows abended status, please check with your instructor before proceeding.

Part 3: Initialize Load to Staging and Target tables

In this exercise you will initialize both staging and target areas with the pre-existing source data.

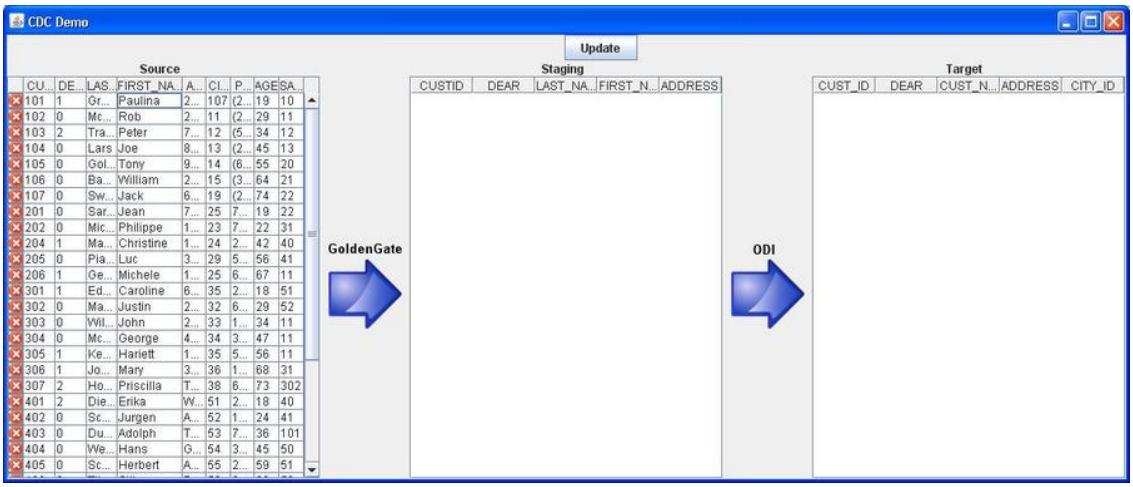
1) **Review the data in source, staging, and target table*:***

   Run following command on terminal window to open demo GUI tool to visualize data flow from source to target as data moves.

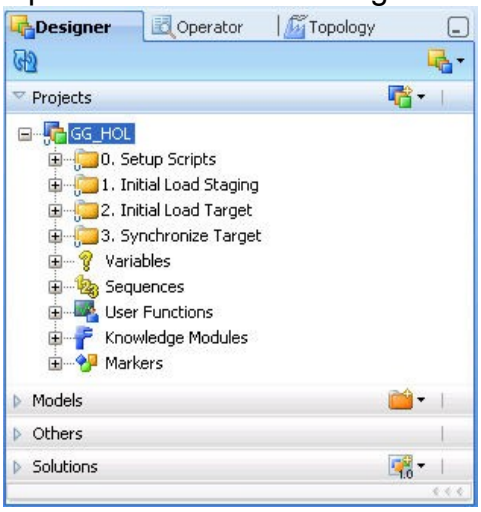
   > startGGDemo

   GoldenGate will capture the changes from source and will replicate the change in staging table from which ODI CDC module for goldengate picks up the change and moves the data to target.

   This client is a custom Java program to display changes in the 3 tables as they occur. At this point only the source table has data. Keep this client tool running during next set of steps to see data at each stage as it moves.This tool is for demo purpose only to visualize and understand ODI+GoldenGate Lab data flow.



2) Open the ODI Studio and go to Designer > Projects.



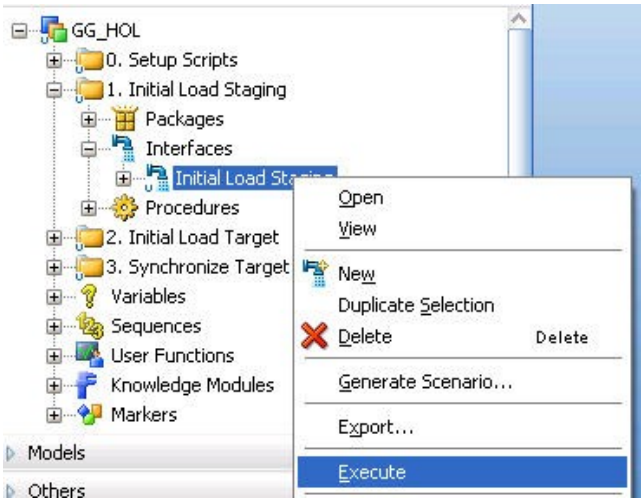
3) **Review folders:** The relevant folders for this GG_HOL project are:
1. **Initial Load Staging:** Performs a 1-to-1 copy from the source tables to the staging tables.

2. **Initial Load Target:** Does an bulk load & transformation from staging to target tables

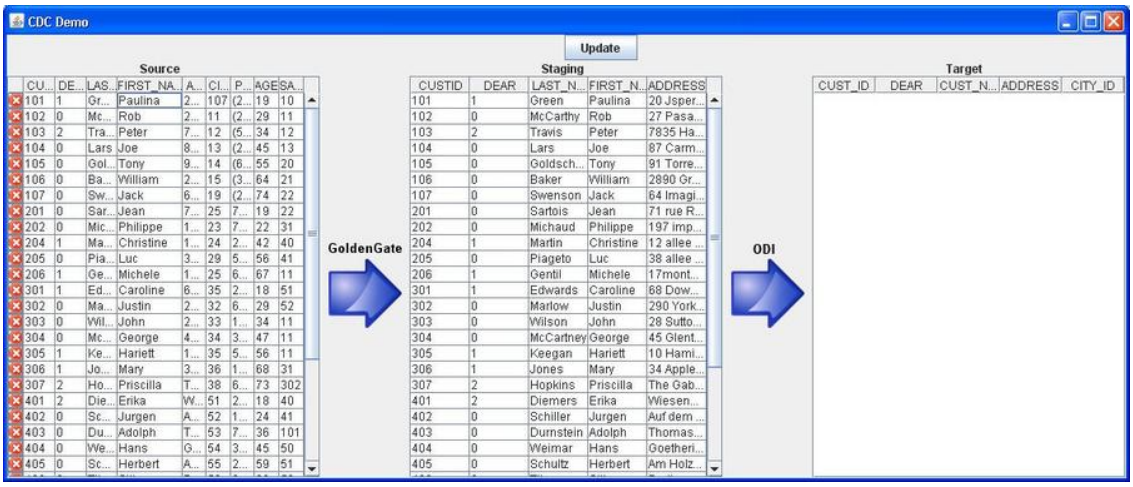
3. **Synchronize Target**: Performs a CDC-triggered load&transformation from staging to target.

4) Expand the folder **1. Initial Load Staging** and its **Interfaces** subfolder:

5) Right click on interface **Initial Load Staging** and select **Execute**. Press **Ok** on the **Execution** and then **Information** dialogs that appear.

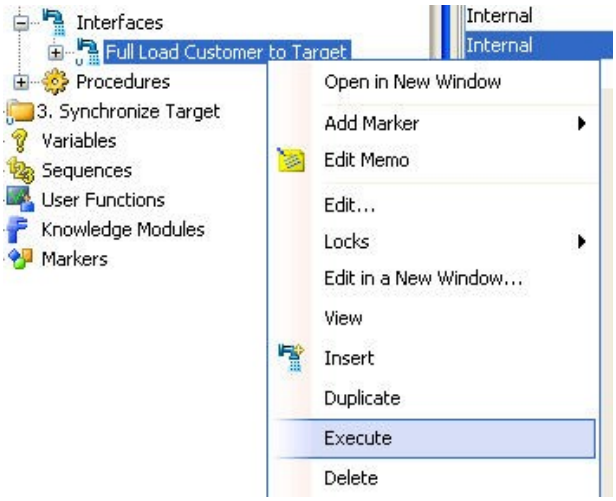


6) Open the ETL Demo Client to review the loading of the staging data:

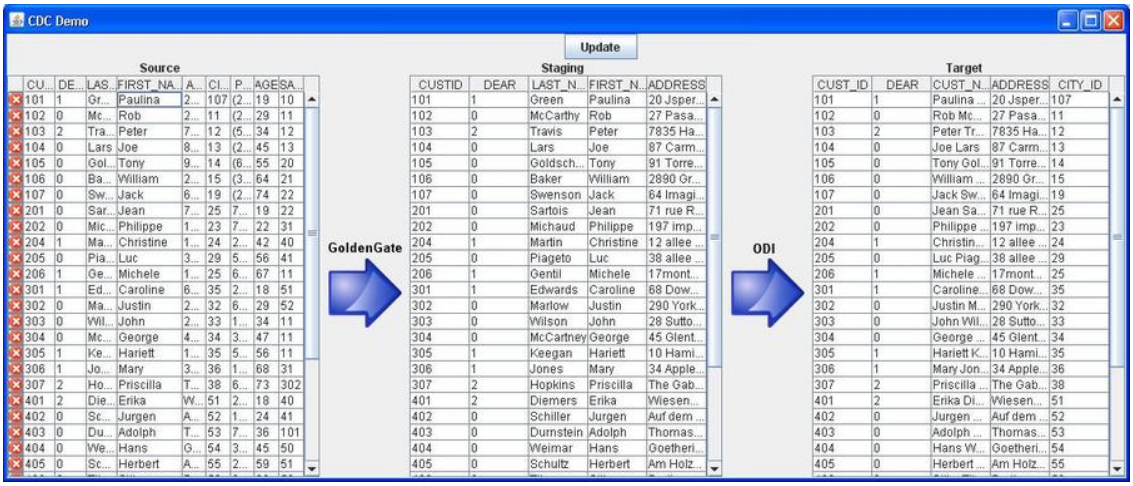


7) Expand the folder **2. Initial Load Target** and its **Interfaces** subfolder:

8) Right click on interface **Full Load Customer to Target** and select **Execute**. Press **Ok** on the **Execution** and then **Information** dialogs that appear.



9) Open the ETL Demo Client to review the loading of the target data:

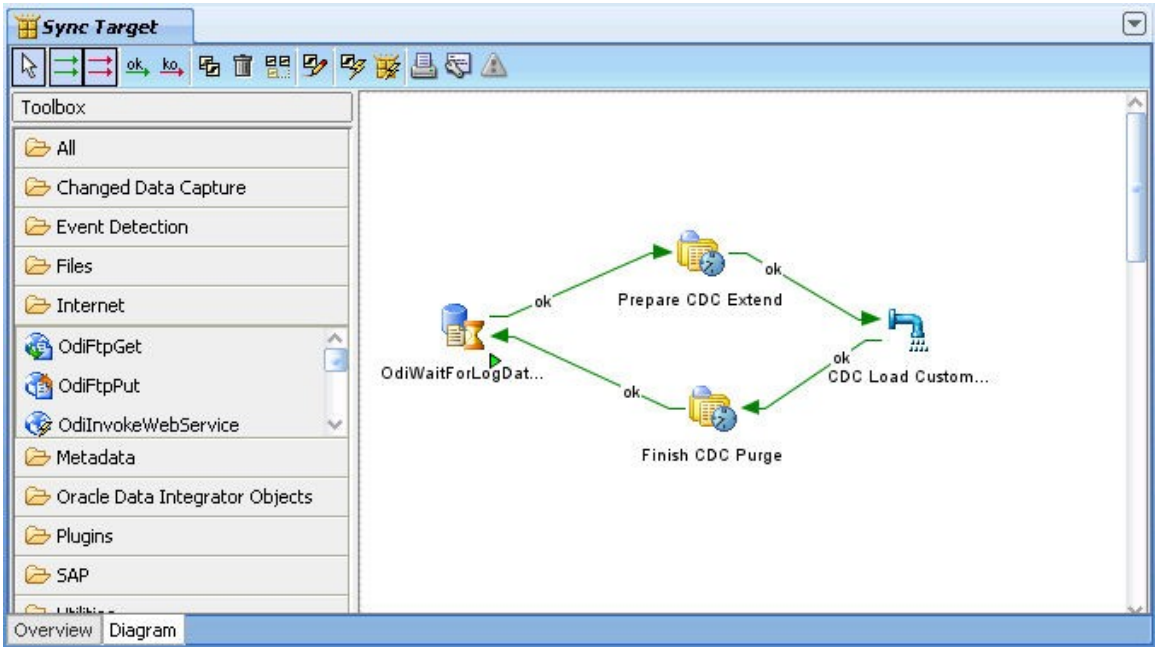


Part 4: Initialize CDC process and perform change operations

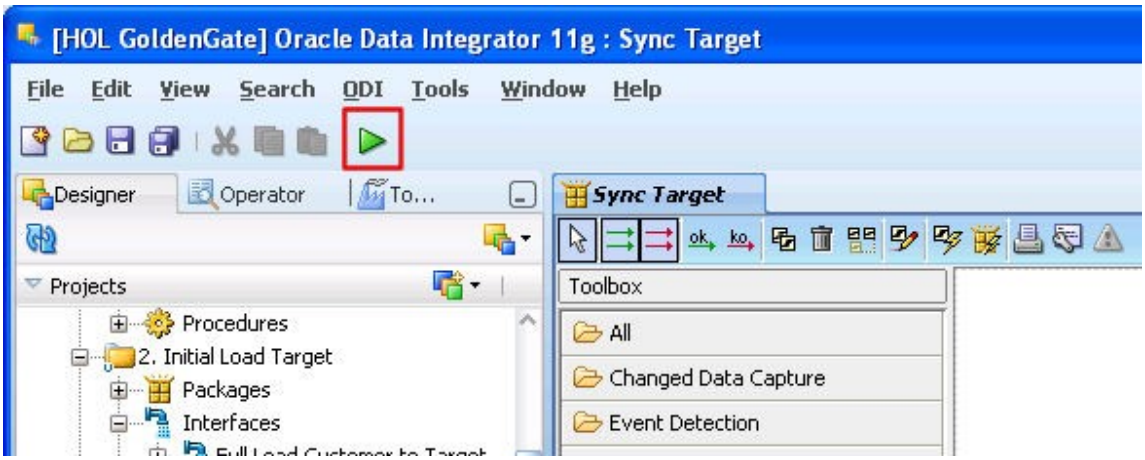
1) Open the ODI Studio and go to Designer > Projects**.**

2) Expand the folder **3. Synchronize Target** and its **Packages** folder.

3) Double-Click on the **Sync Target** package to open it. Click on the **Diagram** tab. The interface consists of a perpetual loop that is triggered by a new journal log entry and processes new changes with the CDC Load Customer interface.



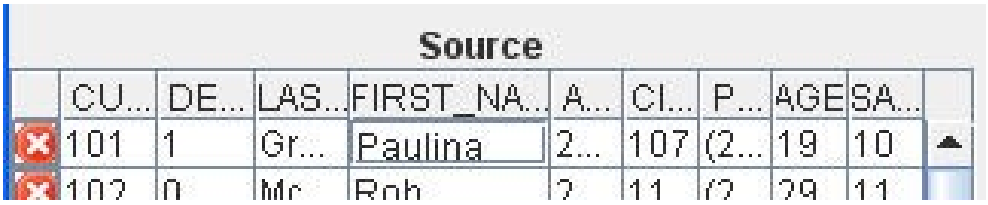
4) Press the Execute button ( ) in the toolbar to start the interface.



5) Open the Operator from the toolbar to review the process of the Sync Target interface.

6) Open the **Date > Today > Sync Target** tree branch in the operator. The interface is currently running and waiting for a new journal entry at OdiWaitForLogData 1.

7) Open the **ETL Demo Client** and double-click on a **FIRST_NAME** of an entry in the Source table. The entry is editable.



8) Edit the name to something else and press Enter. Watch the Staging and Target tables. After a few seconds the FIRST_NAME in the Staging table flashes yellow and after that the concatenated CUST_NAME in the Target

table.


CDC Demo
Update
Source
Staging
Target

CDC Demo
Update
Source
Staging
Target

Lab 17: Web Services and Extending ODI with SDK

A : Data Services

A.1. Introduction

So far, we have mostly processed data in a batch oriented approach. ODI SOA architecture will now allow us to expose data and changed data through Web Services for a real time access to the information.

There are two types of Web Services:

Data Services are specialized Web Services that provide access to data in datastores, and to changes captured for these datastores using Changed Data Capture. These Web Services are automatically generated by Oracle Data Integrator and deployed to a Web Services container in an application server.

Run-Time Services are Web Services that enable users to leverage Oracle Data Integrator features in a service-oriented architecture (SOA). These Web Services are invoked by a third-party application to perform different Oracle Data Integrator execution tasks such as executing a scenario, restarting a session, listing execution contexts and scenarios.

- The ***Public Web Service*** connects to the repository to retrieve a list of context and scenarios. This web service is deployed in a Java EE application server.
- The ***Agent Web Service*** commands the Oracle Data Integrator Agent to start and monitor a scenario and to restart a session. Note that this web service is built-in the Java EE or Standalone Agent.

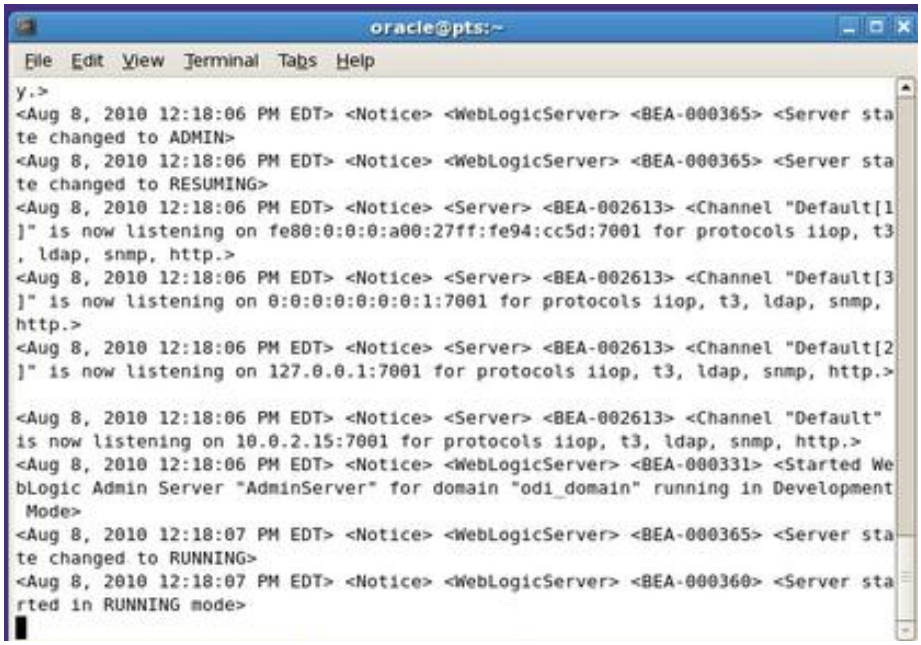
A.2. Web Services Server Setup

The code and runtime components for Web Services will be generated by ODI, but the Web Services themselves will be provided by a Web Services server that will host these components. For this exercise we use WebLogic Server 11g.

In our environment, WebLogic has been installed to serve as our Web Services Server. To start WebLogic, simply execute following command on terminal window:

> startWLS

Once WebLogic server starts, terminal window will show server in running mode. Do not close the window, you can minimize it.

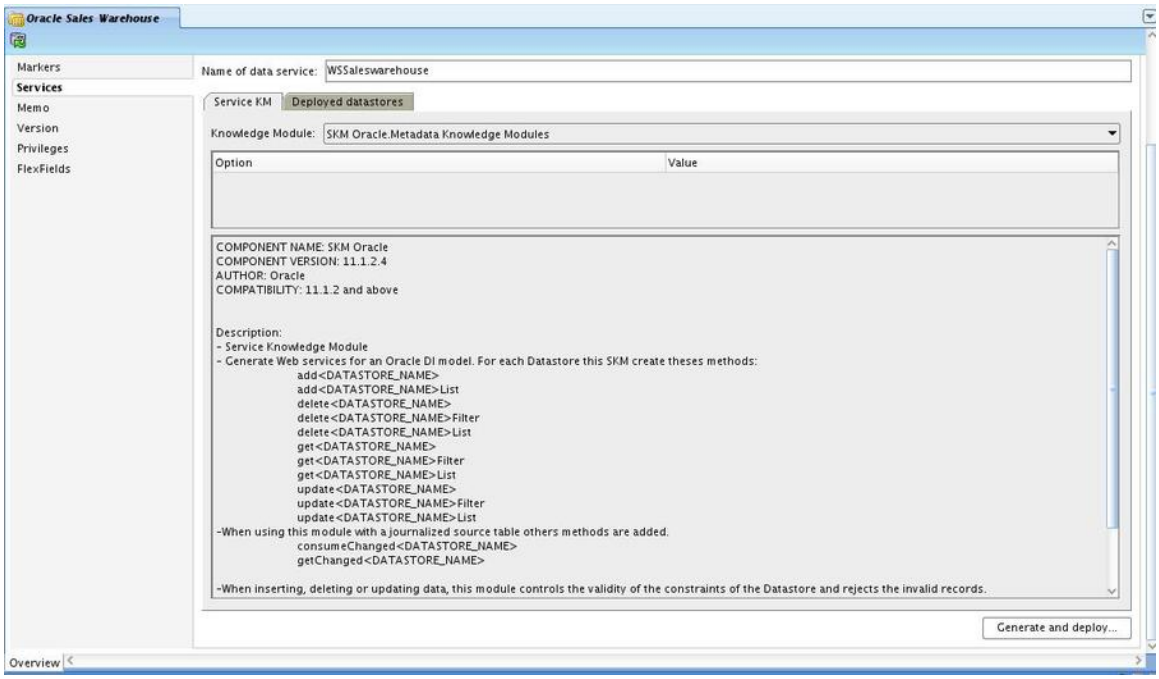


If you want to look into more details as to how the connection to WebLogic is defined in ODI, look in the Topology navigator for the connection information under the technology “WebLogic”. You will find there the necessary information for ODI to store the ODI Web Services web application into WebLogic’s autodeploy directory.

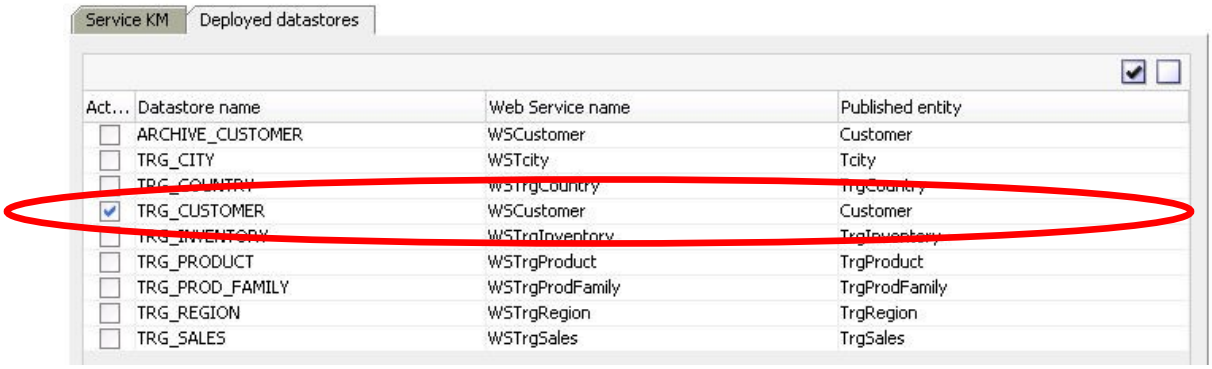
The JDBC datasource for this exercise is defined and deployed to the local WebLogic server.

A.3. Generate and Deploy

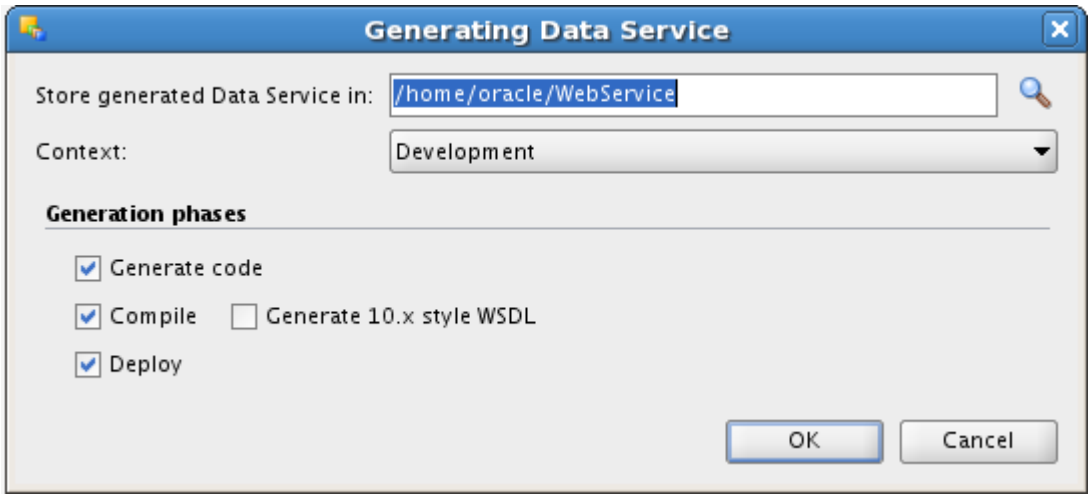
Edit the *Oracle Sales Warehouse* model, go to the *Services* tab and select the appropriate SKM: *SKM Oracle*.



Then click on the *Deployed Datastores* tab, and select the *TRG_CUSTOMER* table.

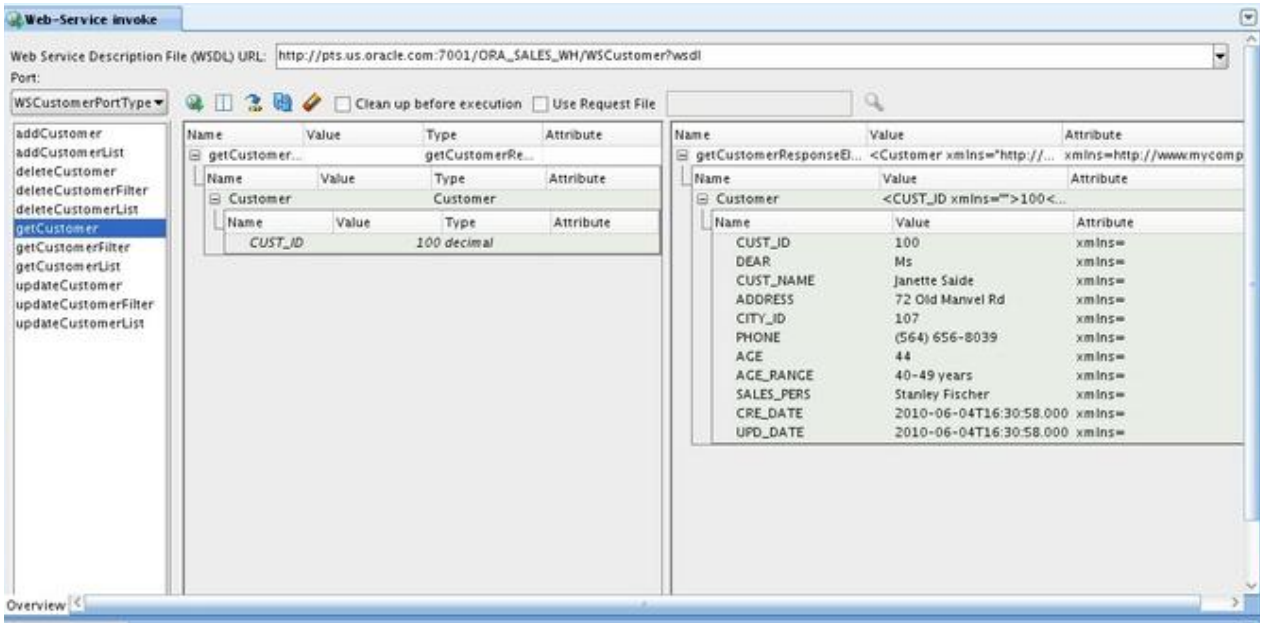


Finally, click *Generate and Deploy*. Select all the options on the following window, and click OK:



A.4. Test the Web Service

- Check that the Web service is properly listed by your app server
- Right-click on the TRG_CUSTOMER table, click on Test Web Service
- Select getCustomer method and enter 100 as Cust_id
- Remove rest of the blank column by clicking  button
- Click on invoke icon to test Web service
- Test Web Service will retrieve the data and show it in SOAP Test GUI.



You can stop Weblogic Server, if not needed, by running following command:
> stopWLS

B : Use SDK to Manage ODI

B.1. Introduction

With ODI 11g, SDK has been improved to provide better access to ODI methods programmatically. SDK provides API to create dynamic mapping or create and execute ODI scenario programmatically. SDK also allows for embedding ODI into third party GUI tool and manage ODI objects through APIs.

B.2. SDK Examples

In workshop Image, we have placed few examples Java program which leverages ODI API to create Agent, Context and execute Scenario. You can run any or all of these examples to understand SDK use and gain understanding of using SDK within Java program.

B.3. Running Java Program using SDK

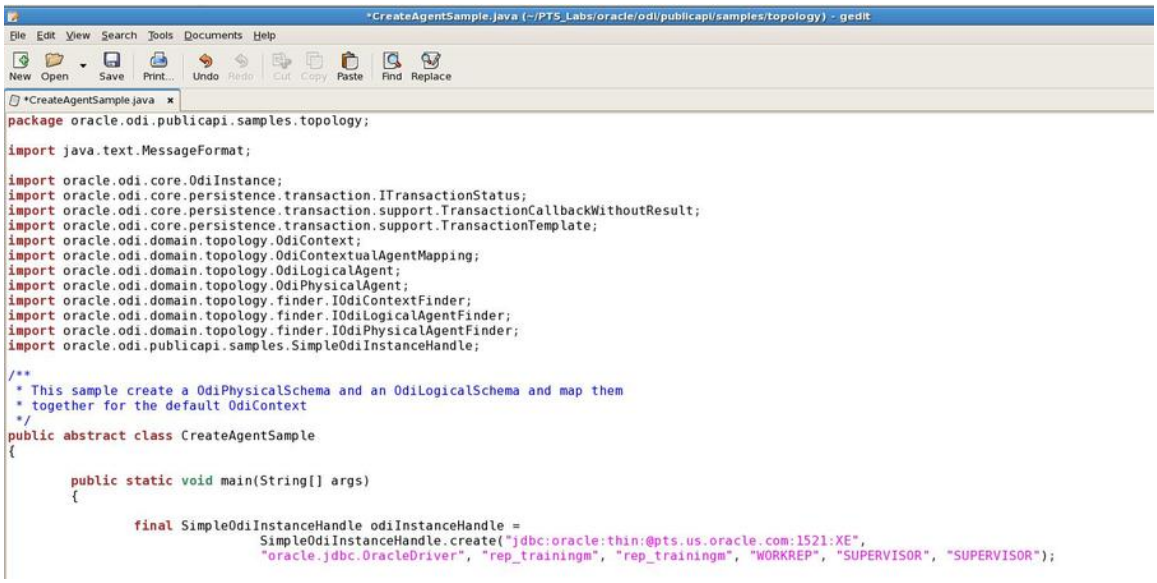
1) Open terminal window and go to dir /home/oracle/PTS_Lab

   cd /home/oracle/PTS_Labs

2) Make sure of connection information, repository information, etc used in the program. Please open java file that creates agent programmatically. From PTS_Lab dir, open java file using gedit command:

   gedit oracle/odi/publicapi/samples/topology/CreateAgentSample.java

3) Make sure repository information, username, pwd, and other parameters are correct. You should change the repository information, connection etc. to a desired repository (e.g. rep_trainingm or newly created SNPM1 repository from Lab 4) so that you can view the execution of program easily. Type in Master repository username and pwd; ODI work repository name; default ODI username and pwd.



4) Save changes made by clicking save button and close the gedit window.

5) To compile java file just created/modified, run following command from PTS_Labs directory:

/app/Oracle/Middleware/jdk160_18/bin/javac -cp $SDKDEMO_CLASSPATH oracle/odi/publicapi/samples/topology/CreateAgentSample.java

You can copy/paste the commands from run_sdk_demo.txt file within PTS_Lab directory.

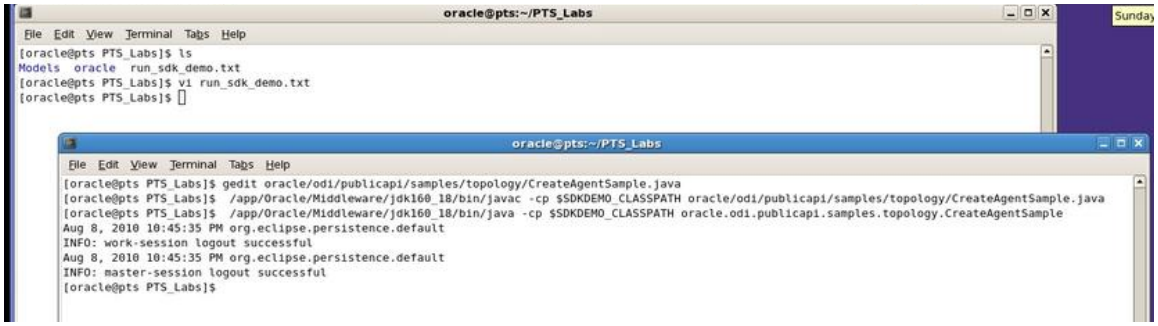
6) To run and test the Java program just compiled, run following command:

   a) First make sure you add current dir into class path by running following command:

export SDKDEMO_CLASSPATH=.:$SDKDEMO_CLASSPATH

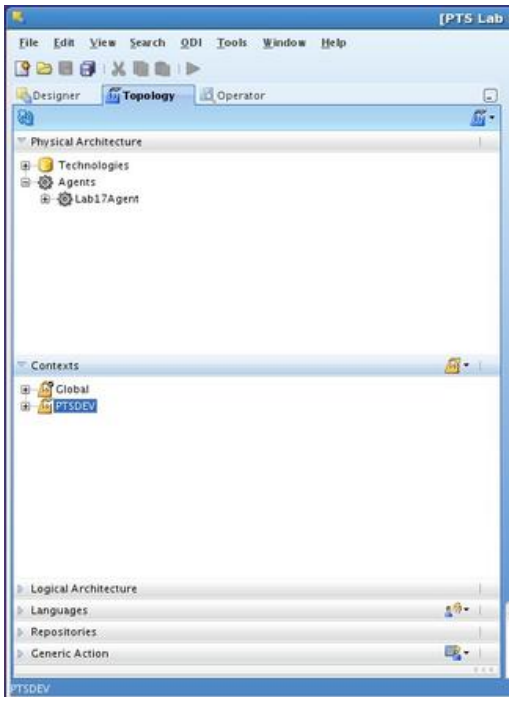
   b) To run java program that creates agent, use following command:

/app/Oracle/Middleware/jdk160_18/bin/java -cp $SDKDEMO_CLASSPATH oracle.odi.publicapi.samples.topology.CreateAgentSample



7) You can run CreateContextSample.java file by modifying it to appropriate parameter, compile and run it to see how it creates context programmatically.

8) Verify within ODI studio that Agent and Context you specified in java programs get created:



9) There are many example java files available if you wish to explore them. These sample java files comes with installation under demo folder:

/app/Oracle/Middleware/Oracle_ODI/oracledi/demo/SDK

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
USA

Worldwide inquiries:
Phone: +1 650 506 7000
Fax: +1 650 506 7200

www.oracle.com

Oracle is the information company